The New England
Journal of Medicine

VOLUME 215 SEPTEMBER 17, 1936 NUMBER 12

THE PRINCIPLES OF THERAPY IN PATIENTS WITH CONGESTIVE HEART FAILURE*

BY TINSLEY R. HARRISON, M.D.†

IN an address delivered before the Massachusetts Medical Society on May 30, 1860, Oliver Wendell Holmes made certain remarks which may be appropriately quoted in any discussion of the treatment of disease:

"A medical man, as he goes about his daily business after twenty years of practice, is apt to suppose that he treats his patients according to the teachings of his experience. . . . But it is easy to prove that the prescriptions of even wise physicians are very commonly founded on something quite different from experience. Experience must be based on the permanent facts of nature. But a glance at the prevalent modes of treatment of any two successive generations will show that there is a changeable as well as a permanent element in the art of healing; not merely changeable as diseases vary, or as new remedies are introduced, but changeable by the going out of fashion of special remedies, by the decadence of a popular theory from which their fitness was deduced, or other cause not more significant. There is no reason to suppose that the present time is essentially different in this respect from any other. Much, therefore, which is now very commonly considered to be the result of experience, will be recognized in the next, or in some succeeding generation, as no such result at all, but as a foregone conclusion, based on some prevalent belief or fashion of the time."

Parenthetically, we may note that we do not have to travel far in order to find an excellent illustration of the truth of Holmes' statement. Digitalis has been successfully used for many years in the treatment of congestive heart failure. Following the development of instrumental methods for the study of the heartbeat, it became apparent that the chief action of the drug, *when studied by these methods*, was in cases of auricular fibrillation. Accordingly, one school of clinicians taught that the drug's only value was in such cases, and this belief is still widely prevalent in Great Britain and to a lesser extent in the United States. The theory of that time, which further experimentation has shown to have been incomplete, demanded that the drug *should* be useful in only such cases, and, accordingly, many physicians were willing to discount the results of daily experience, which pointed toward its value in many cases with regular rhythm as well and omitted to give digitalis to many persons who needed it. Fortunately—and for this Dr. Christian more than anyone else deserves the credit—we have learned what our grandfathers knew, that digitalis is useful in almost all cases of chronic congestive heart failure, regardless of the rhythm.

To return to Oliver Wendell Holmes, "There are, of course, in every calling, those who go about the work of the day before them, doing it according to the rules of their craft, and asking no questions of the past or of the future, or of the aim and end to which their special labor is contributing. These often consider and call themselves *practical men*. They pull the oars of society, and have no leisure to watch the currents running this or that way; let theorists and philosophers attend to them. In the meantime, however, these currents are carrying the practical men, too, and all their work may be thrown away, and worse than thrown away, if they do not take knowledge of them and get out of the wrong ones and into the right ones as soon as they may. Sir Edward Parry and his party were going straight towards the pole, in one of their arctic expeditions, travelling at the rate of ten miles a day. But the ice over which they travelled was drifting straight towards the equator, at the rate of *twelve* miles a day, and yet no man among them would have known that he was travelling two miles a day backward, unless he had lifted his eyes from the tract in which he was plodding. . . .

"Presumption is of vast importance in medicine, as in law. A man is presumed innocent until he is proved guilty. . . . The presumption always is that every noxious agent, including medicines proper which may hurt a well man may also hurt a sick one. . . . Throw out opium, which the Creator himself seems to prescribe, for we often see the scarlet poppy growing in the cornfields, as if it were foreseen that wherever there is hunger to be fed

*The Henry Jackson Lecture delivered before the New England Heart Association, April 30, 1936.

†Harrison, Tinsley R.—For record and address of author see "This Week's Issue," page 563.

there must also be pain to be soothed; throw out a few specifics which our art did not discover, and is hardly needed to apply; throw out wine, which is a food, and the vapors which produce the miracle of anaesthesia, and I firmly believe that if the whole materia medica, *as now used*, could be sunk to the bottom of the sea, it would be all the better for mankind,—and all the worse for the fishes. . . . Suffer me now to lay down a few propositions, whether old or new it matters little, not for your immediate acceptance, nor yet for your hasty rejection, but for your calm consideration."

Those of us who are interested in the treatment of cardiac disease are unwilling to go so far as Oliver Wendell Holmes in the direction of therapeutic nihilism, for we believe that drugs, when properly used, are often of much value to our patients. How well grounded is this belief? Is it based upon wishful thinking, and if not to what extent is it supported by objective and quantitative measurements? Our discussion of today will be concerned with an attempt to answer these questions.

The first principle to be discussed is the following one: *Although we are, speaking broadly, unable to avoid or to remove the underlying causes of cardiac disease, we can, in large measure at least, successfully prevent and treat the precipitating causes of cardiac failure.* For the sake of convenience it is well to divide the underlying causes of heart disease into the more common factors and into the less common factors. The first group comprises vascular disorders, including both hypertension and arteriosclerosis, the rheumatic diseases (including rheumatic fever, chorea and allied disorders) and syphilis. Only in the last mentioned disease is the etiological agent definitely known and a specific therapeutic attack available. Even here, once cardiac complications have set in, the specific therapy has relatively little to offer. Among the more important of the less common underlying causes of heart disease are bacterial endocarditis, congenital lesions, and chronic fibrosing diseases of the lungs. Against none of these do we have satisfactory methods of therapeutic attack. Finally, as relatively uncommon underlying causes of cardiac disease we have thyrotoxicosis and pericardial infections, which are open to surgical attack; severe, long-standing anemia, which can often be treated successfully; and avitaminosis, which, when recognized, offers brilliant therapeutic possibilities. However, it is unfortunately true that until more is known about the nature of the common underlying disorders of cardiac disease, their prevention and treatment will remain in a most unsatisfactory state.

It is fortunate that, in the majority of patients, heart failure does not occur until some precipitating factor is added to the underlying but relatively nonprogressive disease process. The transitions from the asymptomatic stage of the disease to that of diminished cardiac reserve, and from the stage of symptoms only on effort to that of frank congestion with manifestations at rest, are usually initiated by one of the following processes: infections (especially of the respiratory tract), changes in rhythm, cough, violent exertion, pregnancy, obesity, anemia, thrombosis, prolonged severe mental stress and tachycardia, however brought about. The important point is that these trigger factors are in large measure preventable and once having arisen can usually be successfully treated. The management of cardiac disease in its earliest stages therefore resolves itself largely into the question of the prevention and control of these complications.

Of these several trigger factors, infection is probably the most important. Persons with cardiac disease must be trained to avoid exposure to inclement weather, to keep away from individuals with colds, to shun public gathering places during the winter months, to change wet clothes immediately, and when possible to spend part of the winter in a warmer climate. When such individuals are especially subject to respiratory infections they sometimes seem to be benefited by the use of vaccines containing the organisms which are the common secondary invaders in colds.

Exertion is probably—except in manual laborers—less important as a precipitating cause of heart failure than is generally believed. However, one occasionally sees patients whose first manifestations of congestion can definitely be ascribed to some unusual violent effort, such as a dash for a taxicab or a trolley car on a rainy day. Proper education of the patient prevents such eventualities.

Cough is an important and common precipitating cause of heart failure. It can usually be readily controlled by cough syrups containing codein.

To discuss in detail the other trigger factors would lead us too far afield. Except for thrombosis, which usually arises in the later rather than in the early stage of cardiac disease, these precipitating causes of heart failure can usually be prevented or adequately treated, provided sufficient care is devoted to the education of the patient.

The second principle to be emphasized is as follows: *The several and—at first sight—dissimilar methods which are available in treating persons with congestive heart failure have one fundamental action in common: they all tend to rest the heart.* In order to avoid misinterpretation this statement needs to be clarified. Like any machine which performs mechanical work, the heart is subject to variations in efficiency. The heart may expend more energy because it

is doing more work (the term "work" as used here refers to accomplishment), its efficiency remaining constant, or because its efficiency has diminished, the work accomplished remaining constant. Conversely, the heart may expend less energy either as the result of a diminution in its work or an increase in its efficiency.

The work of the heart depends on three factors: the output of blood per unit of time, the average pressure against which this blood is expelled, and the velocity imparted to the blood. Under conditions of low output such as obtain at rest, the last-mentioned factor is sufficiently small to be neglected. Since none of the therapeutic measures which are ordinarily used produce constant changes in blood pressure, it is evident that their chief effect on the work of the heart must be reflected in changes in its output. Certain useful methods of treatment such as rest, sedatives, venesection, dietary restriction, and thyroidectomy have been shown to diminish the amount of blood pumped by the heart, and hence the work done. These therapeutic measures are therefore believed to diminish the energy expended by the heart and to rest this organ.

The mechanical efficiency of the human heart cannot be measured directly by any method which has yet been devised. However, it is known from experiments on animals that when other conditions remain the same the energy expended by the heart varies directly with its diastolic volume. It has also been shown that, when the work performed is kept constant, the energy expended per unit of time is greater at rapid than at slow heart rates. It is therefore evident that therapeutic procedures which either slow the heart or which diminish the size of the heart, tend to decrease the energy expended. Digitalis has both of these effects. The action of this drug on the work performed by the hearts of persons with heart failure is inconstant, the output being increased in some subjects, diminished in others and unchanged in a third group, but the size of the heart is almost always diminished and the pulse rate is usually slowed in significant degree by digitalis. The best available evidence indicates that the beneficial action obtained by this drug is to be ascribed to an increase in the efficiency of the heart which is enabled to carry on its work with a diminished expenditure of energy. The happy results of quinidine in conditions of regular and irregular tachycardia are likewise to be ascribed to increased mechanical efficiency of the heart as the result of slowing in rate. Whether diuretic drugs have any action on the heart directly is still an unsettled question. There is some evidence which indicates that in certain patients diminution in edema is accompanied by a lessening of the blood flow through edematous tissues, and secondarily by a decrease in the work of the heart. Edema of the myocardium also sometimes occurs in patients with congestive failure, and it is perhaps not too fanciful to believe that if diuretic drugs can lessen the accumulation of fluid between the cardiac fibers, they may increase the efficiency of this organ.

The available evidence therefore indicates that procedures which produce benefit in patients with congestive heart failure do so primarily by diminishing the energy expenditure of the heart, and that this is accomplished either by decreasing the work it has to do or by increasing the efficiency of its performance.

The third principle of therapy is this: *Congestive heart failure is a vicious cycle for some of the symptoms produced by it tend in themselves to exaggerate it, and therefore rigid treatment of some of the effects of heart failure tends to help the underlying functional disorder which produces heart failure.*

This conception may be well illustrated by a consideration of the effects of cough, which is a very common symptom of congestive heart failure. Coughing is a violent muscular effort and like other exertion causes an increased metabolism of the body. During coughing there is a marked rise in the intrathoracic pressure. It is important to remember that the right ventricle is normally only about one third as thick as the left, and that the pulmonary arterial pressure is a similar fraction of the systemic pressure; hence a rise of twenty or thirty millimeters pressure in intrathoracic pressure constitutes a serious strain for the right ventricle. Coughing also raises the venous pressure and it is known that a rise in venous pressure produces reflex stimulation of breathing and hence tends to cause dyspnea. One frequently sees patients who have attacks of cardiac asthma which are set off by cough and which can be prevented when this trigger mechanism is suppressed by proper sedation.

Dyspnea, which is usually the most prominent symptom in patients with congestive heart failure, may likewise exert harmful effects. The increased excursion of the diaphragm tends to favor the emptying of abdominal blood into the chest. Venous inflow is also favored by the lowering of the average intrathoracic pressure during the dyspneic state. In normal persons this increase in the blood expelled by the right ventricle is readily handled by the normal left ventricle, but in patients with congestive failure the left side of the heart is usually affected in greater degree than the right and the blood therefore tends to accumulate in the lungs. Hence, dyspnea, which is originally mainly due to congestion of the lungs, tends to cause more congestion and to aggravate itself. In patients who are subject to cardiac asthma, attacks can

sometimes be produced by voluntary increase in respiratory movements.

The labored breathing which accompanies cardiac dyspnea may cause a well-marked increase in metabolism. Dyspneic patients often have a basal metabolic rate as much as 40 per cent above normal, and occasionally as much as 80 per cent. This of course increases the load on the heart.

An important delayed effect of persistent dyspnea is morphine addiction which develops when the drug has to be given repeatedly over a long period, and induces a cachectic state of the body in general, in which the heart is probably not spared.

Edema, another result of heart failure, also tends to have harmful effects. Accumulations of fluid in the abdomen and in the pleural cavities interfere with expansion of the lungs and hence produce dyspnea. When hydropericardium occurs, a heart which already empties with difficulty, becomes impaired in its ability to fill. Subcutaneous edema renders the tissues liable to infection, and heart failure is occasionally terminated by a streptococcic septicemia originating in this manner. In certain patients the blood flow through the peripheral edematous tissues appears to be increased because of impairment to oxygen diffusion.

The evil effects of pulmonary edema are too well known to require comment. However, it should be pointed out that edema fluid is often an excellent culture medium and that patients with edema of the lungs are very subject to bronchopneumonia, which is one of the most frequent causes of death in persons with congestive heart failure. Even in the absence of subcutaneous edema the presence of numerous râles in the lungs of a patient with cardiac disease is usually an indication for the administration of a diuretic drug.

Myocardial edema is not rare in patients with congestive failure. It probably imposes a barrier to oxygen diffusion and interferes with the recovery process in muscle fibers which are in poor condition to tolerate such impairment.

These examples illustrate how certain symptoms, themselves the cause of heart failure, tend to aggravate heart failure. The treatment of these symptoms is therefore not simply a matter of making patients more comfortable but is a fundamental step in the breaking of a vicious cycle which when untreated leads to death. Such a conception explains the great benefit which can be obtained by codein when it abolishes cough, by morphine when it relieves dyspnea, and by diuretic drugs, even in patients with minimal edema. The last point needs to be especially emphasized because it is not generally appreciated. We are all cognizant of the importance of maintenance doses of digitalis in persons who have recovered from outspoken congestive heart failure. Maintenance doses of diuretics are also very useful in such subjects. It is important that ambulatory patients, who have had edema recently, should weigh themselves daily and take theophyllin or some other diuretic drug whenever the scales, by showing sudden gain in weight, point toward the beginning of reaccumulation of fluid in the body. By this plan certain subjects who would otherwise remain practically bedridden can be kept in an ambulatory state and relatively free of symptoms for months and occasionally for years.

A final principle of therapy: *If the foregoing points are borne in mind and patients are treated accordingly, only a very small percentage of the patients who have congestive heart failure die of it, although a good many die with it as the result of various complications.*

During the past ten years the general plan which has been followed at the Vanderbilt University Hospital in the treatment of patients with congestive heart failure has remained relatively unchanged, except that the principles which have been discussed have been recognized as of great importance and have been applied with increasing enthusiasm. We have recently undertaken a survey of the fatal cases in an attempt to determine whether any real advances in therapy have been made in recent years. It was felt that a comparison of the patients dying in the last five years with those dying in the previous five years might be helpful in this regard. In order to eliminate errors in diagnosis, the studies have been limited to patients who have come to autopsy. The various types of heart disease were about equally common in the two five-year periods. The median duration of life after the onset of congestive failure was estimated as accurately as possible from the case histories. In the past five years the value has been eighteen months as compared with eleven months during the preceding five-year period. A study of the chief cause of death has been made in both groups of cases. Uncomplicated congestive failure has in the last five years accounted for 19 per cent of the deaths, while during the previous five years the figure was 32 per cent. Many of these patients died within the first two days in the hospital before therapy could be effective. When these are eliminated it appears that only 9 per cent of the deaths which occurred during the last five years in patients *with* congestive failure were attributable to uncomplicated congestive failure. The value for the preceding five-year period was 24 per cent. In the recent years uremia, pneumonia and massive pulmonary infarction have each accounted for more deaths than has uncomplicated conges-

tive heart failure. Since only about 20 per cent of the patients who entered the hospital with congestive heart failure died in the hospital, the remaining 80 per cent being discharged improved, and since only 10 per cent of the patients who have been treated for several days or longer and died were found at postmortem examination to have heart failure as the chief immediate cause of death, it is evident that our direct mortality at present from congestive heart failure is only about 2 per cent. The indirect mortality—for conditions like infarction and pneumonia are in such patients usually indirect effects of the heart failure—is of course very great. However, these figures seem to indicate that the application of the principles of therapy which have been discussed has led to prolongation of life and to relief of suffering.

To summarize: If the kindly, witty and skeptical Oliver Wendell Holmes were with us today asking his pertinent and disconcerting questions concerning the real value of the therapeutic measures employed in patients with congestive heart failure, we should have to admit that his statement that the general care of the patient is more important than drugs, is just as true in our day as it was in his. The most valuable thing we can do for persons with chronic disease of the heart is to prevent the progression of the disorder by avoiding those conditions which act as precipitating causes of heart failure. Restriction of physical effort to that which can be performed without symptoms, prevention of undue mental and emotional stress, immediate attention to arrhythmias and other causes of tachycardia, abolition of cough, supervision of pregnancy, reduction of obesity, management of anemia, and above all, prevention of infections—these are our most important measures of treatment. When in spite of our care congestive failure supervenes, rest, a proper dietary régime, the restriction of fluids, withdrawal of blood, and the use of opium, which Holmes recommended, are of the greatest value. In addition to these things we would request that Dr. Holmes add digitalis, quinidine and the mercurial and xanthine diuretics to his small list of drugs which should not be cast into the sea. All of these measures appear to have one fundamental action in common, for either they diminish the work done by the heart without affecting its efficiency, or they increase its efficiency so that a given performance of work is performed with a smaller expenditure of energy. In the final analysis the one effect of all therapeutic measures which are useful in the treatment of congestive heart failure is that of resting the heart.

And now for a final quotation from the medical sage of New England, who closed his address as follows: "My friends and brothers in Art! There is nothing to be feared from the utterance of any seeming heresy to which you may have listened. I cannot compromise your collective wisdom. If I have strained the truth one hair's breadth for the sake of an epigram or an antithesis, you are accustomed to count the normal pulse-beats of sound judgment, and know full well how to recognize the fever-throbs of conceit and the nervous palpitation of rhetoric."

CANCER OF THE BREAST

End-Results, Massachusetts General Hospital, 1927, 1928 and 1929

BY CHANNING C. SIMMONS, M.D.,* GRANTLEY W. TAYLOR, M.D.,* AND HERBERT D. ADAMS, M.D.*

THE present communication is the sixth of a series of papers reporting the five year end-results of surgical treatment of cancer of the breast at the Massachusetts General Hospital. This report covers the three year period, 1927 to 1929, inclusive. The results of the surgical treatment of cancer of the breast have been studied and reported since 1894, a period of thirty-six years, with the exception of two periods totaling eleven years.

In 1907, the results of the cases observed at the hospital during the ten year period, 1894-1904, were reported on a three year basis.[1]

In 1921, a similar communication was made, reporting the cases seen in the three year period 1910-1913, on a five year basis.[2]

In 1926, a report was made on the cases admitted to the hospital during 1918-1921.[3]

In 1934, two reports were published one giving the results of treatment during the three year period, 1921-1923,[4] and another for the three year period, 1924-1926.[5]

In the last three reports the cases treated in the private ward were included with those seen in the General Hospital.

This communication is arranged, as far as possible, in a manner similar to that of the previous reports to allow comparison, but changing conditions have made certain alterations necessary. The study of groups of consecutive cases made in this manner, we believe, is the best method of ascertaining the results of a given method of treatment. On the other hand, many factors enter into the prognosis of the individual case, such as, the age of the patient, the extent and duration of the disease and the

*Simmons, Channing C.—Surgeon-in-Charge, Collis P. Huntington Memorial Hospital. Taylor, Grantley W.—Surgeon, Collis P. Huntington Hospital. Adams, Herbert D.—Assistant Surgeon, Massachusetts General Hospital. For records and addresses of authors see "This Week's Issue," page 563.

type of cancer. In practice, therefore, it is necessary to judge each case separately.

Taken as a whole the results of this series of cases are slightly better than those of the previous groups reported and are comparable to those obtained in other large clinics. It is doubtful if much more can be accomplished by surgery until the patients are seen earlier before metastases have taken place. Certain cases of diffuse cancer of high malignancy are probably incurable by any method of treatment now employed at the time the first symptom is noted. On the other hand, there still remains a large group of patients who have been conscious of a painless tumor of the breast for several months before consulting a physician. This situation can be improved only by the education of the public, and efforts along this line are being made by the State and local Departments of Public Health, the American College of Surgeons, the American Society for the Control of Cancer and the United States Public Health Service.

In this communication the term "cure" is applied to those cases living without evidence of disease five or more years after operation. A patient dying of late recurrence more than five years after operation is considered as a failure. Five cases (7 per cent) of the patients living at the end of five years died later of a return of the disease, and in all probability certain of the patients now apparently well will develop late recurrence. Of the 107 cases operated upon in the General Hospital the end-result is known in all but one. This case is recorded as a failure, although the patient may well be living for the tumor was small and of low malignancy and the axillary glands were not involved. Postoperative deaths are considered as failures. Eleven cases operated upon in the private ward have been excluded on account of lack of sufficient data to permit classification.

By radical operation is meant the removal of the breast, with a large amount of subcutaneous tissue, from the midsternal line to the border of the latissimus dorsi, with both pectoral muscles and the contents of the axilla. A portion of the upper part of the rectus sheath is taken in certain instances. Perfect first intention healing was not obtained in every case. On the other hand, the wounds could be closed in practically every instance and secondary skin grafts, made necessary by a sloughing of the flaps, were resorted to in only a few cases.

OPERABILITY

The operability of the cases admitted to the hospital does not represent the operability of the cases at the time of first consultation with a physician. In the General Hospital unoperated cases were weeded out in the Tumor Clinic and Out-Patient Department. On the other hand, many of these cases were hospitalized in order that they might receive adequate radiation treatment. No case is considered suitable for an attempt at radical cure by surgery if the disease has extended clinically beyond the axilla. As a routine, x-ray films of the chest, pelvis and spine are taken before operation to rule out remote metastases. Cases, in which formerly a palliative operation would have been performed, are now referred to the X-Ray Department for treatment.

During the three year period, 260 cases were admitted to the hospital. Of these, in 181 the disease was limited to the breast or to the breast and axilla, while 79 were admitted for radiation treatment.

TABLE 1

CASES AVAILABLE FOR STUDY

1. Primary cases		220
a. Disease limited to breast	69	
b. Disease limited to breast and axilla	112	
c. Advanced, incurable by surgery	39	
2. Recurrence after radical operation		17
3. Recurrence after incomplete operation		23
		260

The 181 primary cases in which the disease was limited to the breast and axilla may be subdivided as follows:

TABLE 2

PRIMARY OPERABLE CASES

	Cases
1a, Disease limited to breast	
Suitable for study	57
Refused operation	1
No follow-up (considered dead of disease)	1
Died without recurrence less than 5 yrs.	5
Private cases excluded on account of insufficient data	5
	69
1b, Disease limited to breast and axilla	
Suitable for study	97
Died without recurrence less than 5 yrs.	5
Postoperative death (considered as failure)	4
Private cases excluded on account of insufficient data	6
	112

Excluding the 10 cases dying of other disease without evidence of recurrence within five years, the case refusing operation and the 11 cases operated upon in the private wards and in which no data are available, there remain 159 primary cases suitable for study. These patients were operated upon by 22 surgeons, but 138 of the operations were performed by members of the Tumor Clinic Staff.

OPERATIVE MORTALITY

There were 4 postoperative deaths. Three of these were due to pulmonary embolism, and in the fourth the cause could not be determined. The operative mortality was, therefore, 4 cases in 180 operations or 2.2 per cent.

RESULTS

Of the 159 primary cases, in which the disease was confined to the breast or breast and axilla, 69 are known to be living without evidence of disease five or more years after operation (43.4 per cent). This is to be compared with the figures given in previous reports (table 3). The

TABLE 3

COMPARISON OF RESULTS OF TREATMENT

Period	Percentage Cures
1894-1904	19
1911-1914	27
1918-1920	30
1921-1923	35
1924-1926	41
1927-1929	43

percentage of survivals at yearly intervals is shown graphically in chart 1.

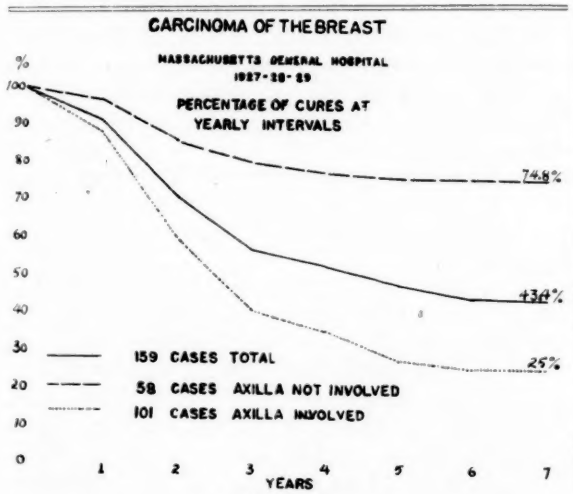

CHART 1.

DURATION OF DISEASE AND RESULTS

Taken as a whole the patients sought advice for a suspicious tumor of the breast somewhat earlier than was previously found to be the case. Of the cases seen in the General Hospital on which we have accurate data, it was found that the average duration of the disease in the cases in which the axillary glands were not involved was 9 months and in the cases in which the glands were involved 12.6 months. The median duration of the two groups which is somewhat more accurate than the average duration was 3 and 6 months, respectively. The duration and its relation to the extent of the disease are reflected in the results (table 4). The percentage of cases in this series without involvement of the axillary glands is given in table 5 for comparison with the previous reports.

TABLE 4

DURATION OF DISEASE—RESULTS

	Average Duration	Median Duration	Percentage Cures
Glands not involved	9 months	3 months	74
" involved	12 months	6 months	24

The possible relation of the social status of the patients to the results of treatment is reflected in comparing the patients seen in the private ward in whom 51 per cent showed no involvement of the axillary nodes with those in the general wards of whom 34 per cent were in this group. This is again shown in the results of operation, there being 53.5 per cent cures in the private patients as against 38 per cent of the patients in the General Hospital.

TABLE 5

EXTENT OF DISEASE

Years	Percentage Limited to Breast
1894-1904	33
1911-1913	31
1918-1926	30
1921-1923	28
1924-1926	41
1927-1929	38

Of the 58 patients in whom the disease was limited to the breast, 44 or 74.8 per cent were living without evidence of disease five or more years after operation. Of the 101 cases in which the axillary glands were involved by disease 25 per cent were cured (chart 1). In other words, a patient has three chances out of four of obtaining a surgical cure if the disease, as far as can be determined, is confined to the breast, and only one chance out of four if the axillary glands are diseased (table 6) (chart 1).

TABLE 6

CURES AND EXTENT OF DISEASE

	Cases	Cures	Percentage Cures
Axillary glands not malignant	58	44	74.8
" " malignant	101	25	25

PATHOLOGY AND RESULTS

Since 1925, the Pathological Laboratory of the Massachusetts General Hospital has, in most in-

stances, given an opinion as to the degree of malignancy of the tumors, dividing them into three groups of malignancy, high, medium and low. The majority of the cases fall in the second group. The grading is based on the degree of differentiation of the cells, that is, the tendency to form glands and evidence of secretory activity, the uniformity in the shape and size of the cells, the number of mitotic figures and the tendency of the tumor to infiltrate surrounding tissues and lymphatics. The relation of the degree of the malignancy to the prognosis has been shown in previous communications, and the present series substantiates the findings. There were 15 cases in which the end-result was known that were classed as being of low malignancy and of these 14 are well. The axillary glands were involved in only one case. In the group of medium malignancy there were 90 cases of which 43 are to be regarded as cures; and, in the group of high malignancy, there were 47 cases with 11 cures. The three groups gave 93 per cent, 49 per cent, and 23 per cent cures, respectively (table 7) (chart 2).

TABLE 7

PATHOLOGICAL INDEX OF MALIGNANCY AND CURES

(Specimens from 152 cases available for review)

(Four postoperative deaths and one untraced case excluded)

	Cases	Cures	Percentage Cures
Grade 1	15	14	93
2	90	43	49
3	47	11	23

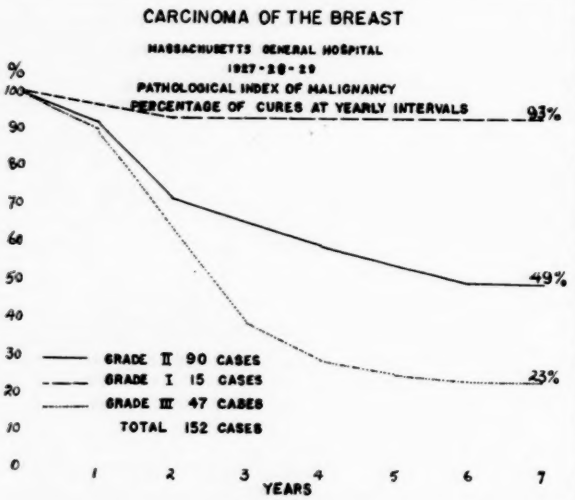

CHART 2.

Of the 16 cases of cancer of low malignancy, the axillary glands were diseased in only 1 instance. Of the 94 cases classed as being of medium malignancy, 57 showed involvement of the axillary glands; and, of the 45 classed as being of high malignancy, the axillary glands were involved in 38 (table 8). It is to be inferred from these figures that the degree of malignancy has a definite relation to the rapidity of the growth and spread of the disease. In this series a cure was obtained by radical operation in every case of cancer of low malignancy in which the disease was confined to the breast.

TABLE 8

PATHOLOGY AND EXTENT OF DISEASE

(Specimens from 155 cases available for review)

	Cases	Axilla Involved	Percentage Involvement
Grade 1	16	1	6
2	94	57	60
3	45	38	84

RESULTS OF TREATMENT AND AGE OF PATIENT

It is generally accepted that cancer in young women, that is individuals under 40, is more malignant than in older women. In the last series studied, of 17 patients under the age of 40, 6 or 34 per cent were cured by operation. In this series only 10 per cent of patients under 40 were cured by operation.

In analyzing the cases further, it was found that in the previous group in 8 of the 17 cases (48 per cent) the disease was confined to the breast and the 6 cures were obtained in this group. In the present series there were 20 cases under 40 years of age. There were no cases of low malignancy and only 4 in which the disease was confined to the breast, 2 of which were cured.

We agree with the statement often made that the prognosis of cancer of the breast, taking the cases as a whole, is worse in women under 40 years of age, but believe that a cancer of low malignancy curable by surgery is often seen before 40, and the fact that the patient is in the third decade of life should not alone deter one from attempting to obtain a cure by radical operation. The results obtained in the different age groups compared with those obtained in the series reported in 1924 to 1926 are shown in table 9.

TABLE 9

AGE AND RESULTS

1924-25-26			1927-28-29	
Percentage Cures	Cases	Ages	Cases	Percentage Cures
34	17	31-40	20	10
40	53	41-50	41	51
44	50	51-60	47	44
40	11	61-70	33	49
33	9	71-80	10	70

It will be noted that the figures from the present series coincide more closely to the prevailing ideas of the relation of the curability of cancer of the breast to the age of the patient. It also illustrates two facts, first, the fallacy of drawing conclusions from a small series of cases and, secondly, that each case should be considered individually before determining on any form of treatment.

PROPHYLACTIC RADIATION AND RESULTS OF TREATMENT

A special group of 94 consecutive cases observed at the General Hospital and operated upon by members of the Tumor Clinic Staff was studied to determine the effects of preoperative, prophylactic radiation treatment in conjunction with surgery. Forty-two patients were referred to the X-Ray Department and received preoperative radiation treatment. A series of four exposures was given on four successive days, totaling 800 r units. This, at the present time, would be considered a light treatment, but was comparable to that given in many clinics during the years under consideration. To make a fair comparison of the treatment, the cases were divided into those with and without axillary involvement. The results are shown in table 10.

TABLE 10

RESULTS—PREOPERATIVE PROPHYLACTIC RADIATION

	Cases	Cures	Percentage Cures
Glands Not Involved			
Radiation	13	10	77
No radiation	16	12	75
Axillary Glands Involved			
Radiation	28	7	25
No radiation	36	9	25

From these figures it is to be inferred that preoperative, prophylactic radiation as given to this group of cases did not improve the prognosis. This has been our experience in previous groups of cases studied, and it is difficult to reconcile the results with the reports of certain other observers. It would be interesting to determine if the results of this treatment varied with the degree of malignancy of the tumor or age of the patient; but, if the cases are divided in this manner, there are too few in each group to make the figures of value. An artificial menopause by radiation treatment was not brought on in any case in this series.

SUMMARY

The five year end-results of 159 cases of cancer of the breast treated by radical operation at the Massachusetts General Hospital during the three years, 1927, 1928 and 1929, are reported. The results are compared with similar groups of cases previously analyzed.

There were 43.4 per cent of five year cures following radical operation. Of the 58 cases in which the disease was limited to the breast, 44 or 74.8 per cent were living without evidence of recurrence from five to seven years after operation. Of the 101 cases in which the axillary glands were involved, 25 or 25 per cent were living without evidence of disease from five to seven years after operation.

The prognosis was found to depend more on the extent of the disease and the pathologic index of the malignancy of the tumor than on any other factors. This coincides with the findings in the former groups studied.

The median duration of the disease before operation of the cases without axillary involvement was three months. The median duration with axillary involvement was six months. The importance of early diagnosis and treatment is shown by comparing results of operation in these two groups.

Preoperative x-ray treatment was given to a certain number of these patients. It had no effect on the results when the cases were placed in comparable groups. The dosage was much less than that advocated at the present time, but was similar to that given at other institutions during the period under investigation.

REFERENCES

1. Greenough, R. B.; Simmons, C. C., and Barney, J. D.: The results of operations for cancer of the breast at the Massachusetts General Hospital from 1894 to 1904. Surg. Gynec. & Obst. **5**:39 (July) 1907.
2. Greenough, R. B., and Simmons, C. C.: End-results in cancer cases: cancer of the breast. Boston M. & S. J. **185**:253 (Sept. 1) 1921.
3. Greenough, R. B.: Carcinoma of the breast; results of treatment 1918-1919-1920. Am. J. Roentgenol. **16**:439 (Nov. 1) 1926.
4. Greenough, R. B., and Taylor, Grantley W.: Cancer of the breast: end-results, Massachusetts General Hospital 1921, 1922, and 1923. New Eng. J. Med. **210**:831 (April 19) 1934.
5. Simmons, C. C.; Taylor, Grantley W., and Wallace, Richard H.: Cancer of the breast: end-results, Massachusetts General Hospital 1924, 1925, and 1926. New Eng. J. Med. **210**:836 (April 19) 1934.

ADDRESS TO THE STAFF OF THE WORCESTER CITY HOSPITAL

May, 1936

BY SAMUEL B. WOODWARD, M.D.*

PRESIDENT Ward, who thinks that I was a member of the original staff of this Hospital, has asked me to tell you the story of its early years. As the youngest of the fourteen men who formed that staff would, if living, be 90 years of age and the oldest 125, it seems to me superfluous to state that he is mistaken in his assertion. No, I was a college freshman when, in 1871, the report of a Committee of the City Government appointed to "consider the expediency of establishing a City Hospital" called attention to the fact that there were in Worcester no hospital facilities whatever, except those of the Sisters of Charity Hospital on Shrewsbury Street which was "so small and restricted in its operations as to be of little public importance". It must be, to you younger men, difficult to realize that but sixty-nine years ago this city of then some 20,000 inhabitants depended on an institution with but four or five beds to care for those who were ill, while for the stranger within its gates there was no recourse but the hotel bedroom or a cot at the poor farm or, if seriously injured, temporary treatment in a room connected with the police station in the City Hall basement and, on the first train available, transfer to the Massachusetts General Hospital in Boston.

The Insane Hospital on Summer Street, opened in 1832 to provide a refuge for the pauper insane, had of course long been prominent on the eastern horizon, but there was no provision whatever for the institutional care of the sick and injured but that provided by the sisters of St. Anne's Convent in the general hospital already mentioned, which the Rev. John J. Power had in 1867 thrown open to a limited public. To the west there was, so far as I know, no general hospital until New York was reached, and not until after the Civil War was any attempt made to erect one.

When in 1794 the thirty-six physicians who founded the Worcester District Medical Society came booted and spurred from the surrounding country on their sturdy nags, there was but one of them who had ever seen a hospital, and incidentally but one who had ever heard a medical lecture or attended a medical school. They came here in protest against the arrogance of the Massachusetts Medical Society which in twenty-three years had elected but one member from a town west of Framingham, and by persistent insistence upon articles of incorporation they did eventually force the state society to change its narrow and exclusive policy, to extend its wings beyond Suffolk and Middlesex and, eventually, to include in its membership all medical men of respectable attainment throughout the State.

As I have said, there was no hospital in Worcester for these men to visit. There had never been one, if we exclude those temporarily established during the frequently recurring epidemics of smallpox, those where before and even after Jenner's day people went to be inoculated with the disease. We know that in 1776, when 4 per cent of the inhabitants died of smallpox, which would mean nearly 8,000 at the present time, Dr. Joseph Lynde had charge of the smallpox hospitals and that in the year of this assemblage of physicians several such places were opened under the care of Dr. Elijah Dix, grandfather of the famous Dorothea Dix, who did so much to improve the care of the insane.

In 1850 great efforts were made by Dr. Wilder of Leominster to establish here a county hospital, but sufficient money could not be obtained and the project was abandoned. The District Medical Society was prominently identified with this movement.

In 1851 Dr. Seth Rogers opened his water cure establishment on the street still appropriately called Fountain, where patients were given the opportunity to receive the peculiar benefits supposed to be inherent in cold water baths internally and externally applied. This hospital was in existence for thirteen years and until Dr. Rogers left town in 1864. Strangers used to be taken up to look at least at the outside of the building as one of the city sights.

Then came the Civil War, and the opening of the Wellington Hospital in 1862 and the Dale Hospital in 1864 may well have suggested to Icabod Washburn and to George Jacques the desirability of some provision for the care of sick and injured civilians. At any rate in the nine years, 1862 to 1871, in which latter year the City Hospital was finally opened, no less than six hospital projects were brought before our citizens. Mr. T. W. Wellington, who lost two sons in the war, convinced that the Massachusetts sick and wounded were not properly cared for in Washington, tried desperately to persuade the Secretary of War to have them removed to the state from which they had enlisted. His efforts were unsuccessful, and, determined to care at least for those

*Woodward, Samuel B. — President, Massachusetts Medical Society, 1916-1919. For record and address of author see "This Week's Issue," page 563.

who became sick or disabled in the various camps of instruction (there were two of these in Worcester), he opened at his own expense and maintained for five months a hospital at 110 Mason Street, where some fifty or sixty patients were attended by Dr. Oramel Martin with the occasional assistance of other physicians. Recruiting had ceased; the regiments in Worcester had gone to the front; there were, therefore, in a short time no patients; and, the hospital opened in August, 1862 was closed in January of the next year. The steward in charge was one Lunsford Lane, a former slave, then living in Worcester and well known to Mr. Wellington.

In August, 1864, the government, reversing its attitude, opened on the grounds of the abandoned, much turreted building on Providence Street, erected for the use of the Botanic Medical School, later occupied by the Worcester Female Seminary, and now by Worcester Academy, a hospital of 1,000 beds with fourteen one-story wooden wards, 160 feet long by 30 in breadth. It was never completely filled, but at one time as many as 600 patients were being cared for. Dedicated with much ceremony, with the Governor and his staff present, in February, 1865, but two months before the fall of the Confederacy, it was, less than a year later (the emergency for which it was created having passed away) discontinued, the material sold and the site abandoned.

In 1869, Mr. Icabod Washburn died, leaving in the hands of trustees a sum of money to be expended in the foundation and maintenance of a hospital in memory of his deceased daughters. The next year Dr. Albert Wood, City Physician, in his annual report strongly advocated the establishment by the City of a hospital of at least twenty-five beds, and, as the Washburn bequest could, under the terms of his will, not be used until five years after his decease, the City with commendable and unusual promptitude obtained from the Legislature authority to establish and maintain a hospital for the reception of persons who "by misfortune or poverty should require relief during temporary sickness". The Act was passed May 25, 1871 and with surprising speed in five months the Abijah Bigelow house on the northwest corner of Front and Church Streets was rented and altered so that it could accommodate eight to ten persons. Dr. John G. Park was made Superintendent, a staff of twelve physicians was appointed and the first patient received on October 28 of the same year. The building was immediately crowded and during the first twelve months twenty applicants were rejected for want of room. Dr. Park, who afterwards became the Superintendent of the Worcester Insane Hospital, was not particularly interested in the work and Dr. Leonard Wheeler, who had just come to town, took over the superintendency before the end of the first year, namely, in June, 1872. His name is appended to the first report in December of that year. Dr. Wheeler, as you all know, died but a few months ago and the changes in Worcester hospitals during his life were certainly stupendous. A staff of fourteen physicians, for two more were added during the first year, to care for a hospital which in fifteen months received but 176 patients sounds absurd, but one must remember that this was a city institution and no leading physician could well be passed over, and, as I remember it, none were. The original staff consisted of the following well-known men:

CONSULTING PHYSICIANS

Dr. Joseph Sargent, the first man who succeeded in breaking down the monopoly established by Doctors Green and Heywood, who, by refusing to consult with any new physician who tried to locate here, had driven several away, including Dr. Homans, father of Doctors John and Charles Homans, the well-known Boston physicians.

Dr. F. H. Kelly, later Mayor, and Dr. Merrick Bemis, afterwards Superintendent of the Insane Hospital, were also on this Board.

VISITING PHYSICIANS

Rufus Woodward	Albert Wood
George H. Bates	Emerson Warner
Oramel Martin	George E. Francis
Henry Clark	John G. Park
Joseph N. Bates	Henry W. Simpson
Thomas H. Gage	John O. Marble
J. Marcus Rice	Leonard Wheeler

You will note that all the medical men are called physicians. It was not until 1881, ten years later, that a distinction was made and the list divided into Visiting Surgeons and Visiting Physicians. Whether during those early years the man on duty treated both medical and surgical cases indiscriminately I do not know, but it seems to me not improbable, for when the Memorial Hospital was opened in 1888 three physicians were appointed to care for women and three for children; and, under my care as one of those responsible for patients above the age of puberty, I treated pneumonia and heart disease, operated for hernia, did tracheotomies and amputated limbs, to say nothing of setting broken bones and caring for intestinal disorders. It takes six doctors now to do what one did, or was supposed to do, in those days. He did what he could, did it more or less well and nobody thought of preparing himself for any specialty, barring those who expected to confine their practice to the care of eyes and ears. There was no oculist and aurist connected with the City Hospital until Dr. Lewis E. Dixon received this appointment in 1874, or a microscopist and pathologist, as he was called, until the Hospital had been four years in operation, when Dr. W. H. Workman was appointed to this position.

It may interest you to know that Dr. Park's salary was fixed at $700 a year, that the Matron's compensation was $25 per month and that the total expenses for the first year were in the neighborhood of $6,000, while ten years later they were but $8,000.

In their very first report the Trustees complained of the inadequacy of accommodations and undesirability of the situation, declaring that a hospital of forty beds, at least, in a more retired situation was desirable. Things began to move with great speed.

In March, 1872 Mr. George Jacques, one of the Trustees, deeded to the City a hospital site of three and one-half acres of land on the south side of Prince Street. Prince Street, now Jacques Avenue, was then a narrow way running through the Jacques land from near his house on Wellington Street as far as King Street. Mr. Jacques' deed provided that it should be widened to the extent of fifty feet and "so made as to be in reasonably good condition for carriages to pass over", while $25,000 had to be appropriated and laid aside by the City within one month from the date of the deed, said money to be used for the erection of a hospital of not less than twenty-five beds and that within three years.

Mr. Jacques died five months later, leaving the bulk of his estate with an estimated value of over $200,000 for the furtherance of the same object, the erection of a hospital for the sick poor. This estate included a large tract of unimproved and unoccupied land, twenty-one acres in all, on Wellington and Chandler Streets, on both sides of Prince Street, and included the land previously deeded, where the City Hospital now stands.

In 1874 the hospital was moved from Front Street to the Jacques homestead on Wellington Street, while awaiting the action of the City in the matter of erecting a proper hospital on the site provided. Sixteen patients could then be cared for and two years later the building of two wooden pavilions, with accommodations for five to eight patients respectively, nearly doubled the accommodations provided. A room for autopsies was arranged in the old barn.

It is pleasing to note that delay and shilly-shally are not confined to our times and that Mr. Jacques built better than he knew, or perhaps knew his city better than most people. He provided in his will that the City should forfeit $200 every month until a permanent hospital was built on the site provided by him and for eight years, while the Trustees and the city fathers debated and talked and talked some more and nobody wanted to have the hospital built where Mr. Jacques had planned to have it, $200 came to the Jacques fund twelve times each year. The Trustees thought that the lot was too long and too narrow, that it faced the wrong way, that it was too far away from the city center and that the site where they were was the better one and the City applied to the Supreme Court for a release from the obligations of the original deed. The Supreme Court refused this request; the Trustees finally agreed to the plan and incidentally to the architect's plan. In 1878 the City got busy, in 1880 work was begun and in December, 1881 the hospital with two wards to accommodate forty patients, an administration building, a kitchen and a laundry, was finished and occupied.

It may be of interest at this point to call attention to the fact that in 1878 a committee of the Trustees, appointed to consider the rearrangement of the city land on Prince Street, stated "If the proposed arrangements be carried out, there will be a tract 400 by 700 feet, thus furnishing abundance of land for hospital purposes and an opportunity to accommodate such buildings as may be hereafter required by the Memorial Hospital or the Washburn Free Dispensary, if arrangements should be made for their joint occupancy of land belonging to the City." Four hundred feet by 700 for both hospitals and this at a time when, as I shall show in a moment, one-story buildings only were to be thought of. Four hundred feet by 700 for both hospitals. Ye gods! How short a time ahead can anyone really look.

As an explanation of the plan of the original hospital and an instance of the medical feeling of the time, be it noted that the committee of the staff quoted numerous authorities to prove that no more large or high buildings for hospitals should be in the future erected, "because the aggregation of the sick in such buildings begets and brings to maturity a most formidable enemy which has been christened hospitalism". "All statistics show," said they, "that the rate of mortality increases in a nearly geometrical ratio to the number associated together," and they quoted a medical authority who said, "It has been shown that an outbreak of surgical fever can with certainty be predicted when the number of severe cases reaches a given point. In a ward of fourteen beds, if there be more than seven open wounds, then septic disease will certainly break out." It was for this reason that the Hospital was built in the form adopted, with the expectation that the two one-story wards would, after a few years' use, be destroyed and others erected in their place. With this objective in view, at the Boston City Hospital, while I was an intern, a ward was built of wood so that the loss by its intended destruction would be minimized. The staff committee went on to say—"What the sick need is fresh, pure air. The fewer there are crowded together, charging the air with their fetid and poisonous exhalations, generating the miasma of hospitalism, the better their chances

of recovery." Sir James Simpson defined hospitalism as "the unfavorable action of a crowded hospital on its inmates" and with every wound streaming with pus, with doctors and nurses with unwashed hands passing from one dressing to another, with no wound, unless by some miracle, healing by first intention one can understand that pure air was a consideration devoutly to be wished for, but practically impossible of attainment. What one of you, bar Dr. Hunt, if he is here, ever saw a case of so-called hospital gangrene? In 1878 I saw in Boston such an epidemic that all operating was suspended for several weeks for the simple reason that every person operated on was attacked by this disease and every one, without exception, died.

In 1881 the Hospital opened on its present site with Dr. Everett in Dr. Workman's place as pathologist. In 1883 I succeeded him in that position and Dr. Getchell became the first intern. There was no great excitement over these appointments. Neither Trustees, Committee of the Staff nor the Superintendent mentioned the important event in their reports.

In 1886 I became a visiting physician and in 1887 a visiting surgeon, still being retained as pathologist and doing autopsies directly under the surgery where I might have provided the subject a short time earlier. Dr. Danforth finally took my place as pathologist and in 1902 I resigned from the staff and was made a consultant, one of those people that nobody ever consults, except Dr. Hunt, who once asked me to my great gratification to see a case with him.

I may note that Ray Greene was an intern in 1889 and Fred Baker, who was your (our) pathologist for nearly 42 years, was the intern in 1891, that when the present hospital building was opened there had been 2,700 patients treated in twelve years, in comparison with the 9,988 admitted in the one year, 1935, that the Training School was opened with five pupil nurses in 1881 and incidentally that the first graduation held under a tent in the yard 43 years ago was honored (?) by an address from the present speaker, that the personnel of the Hospital when on Wellington Street consisted of a superintendent, a matron, one male and one female attendant, a night watchman, a cook and assistant, a janitor and a laundress, that after the removal one male and one female attendant were added, an additional assistant to the cook was appointed, as also a fireman, the janitor and the laundress being apparently dispensed with.

People in those days did not, as a rule, wish to go to hospitals where they were liable to say the doctors experimented on them, yet there was one disease then extremely prevalent, now rare indeed, that helped to keep the meagre number of beds in the buildings on the two sites first utilized from what a distinguished American has called innocuous desuetude. This disease was typhoid fever.

Out of 176 admissions in 1872, twenty-three —one in every seven—were typhoid cases. Eleven cases of typhoid fever were admitted in 1873, ten cases of typhoid fever were admitted in 1874, fifteen cases of typhoid fever were admitted in 1875, thirteen cases of typhoid fever were admitted in 1877, nine cases of typhoid fever were admitted in 1878, eleven cases of typhoid fever were admitted in 1879, and thirteen cases of typhoid fever were admitted in 1880. One case to each seventeen of the 1,595 admissions for the eight years. Did you in 1934 have 552 cases of typhoid fever among the 9,384 patients admitted to the wards? You did not, and if you had received that number, you would have been, pardon the expression, almost scared to death. In 1928 you received three, in 1929 seven, in 1930 seven and practically none in the last few years. Typhoid is gone, or nearly so, but I can remember when a whole ward of typhoid cases cluttered the Boston City Hospital for weeks on end.

"Firsts" are always interesting to those who have had anything to do with them. I saw, in 1878, Dr. Fifield do the first ovariotomy done in a hospital in Boston. I, myself, did what I thought a wonderful operation when I opened the abdomen to close a perforating typhoid ulcer. Called one afternoon by Dr. Gage in consultation, I stood by while he performed the first appendectomy done in Worcester; and, *mirabile dictu*, I induced the Chairman of the Trustees to allow me to accept a fee from a patient I had sent in who resented being classed as a "pauper", as he put it. This was the first time any member of the staff ever received pay for his services. The next year the rules were changed and fees under certain conditions were allowed.

Gentlemen, the world does move, but sometimes it seems to move very slowly. It has, however, moved medically so fast since I retired from practice fifteen years ago that I can no longer understand the articles in the medical journals and am reduced to reading the advertisements and the editorials.

NEW HAMPSHIRE MEDICAL SOCIETY

ARTIFICIAL PNEUMOTHORAX IN THE TREATMENT OF TUBERCULOSIS*

BY JOHN D. SPRING, M.D.†

THE four great corner posts upon which our treatment of tuberculosis is set are rest, food, fresh air and education. Of these four, by far the most important is rest. The part it plays, however, depends upon the organ affected. A tuberculous knee can be put into a cast and out of function more easily than a tuberculous kidney. The lung occupies a sort of middle ground, as it can be put at varying degrees of rest.

When simple bed rest will not control active disease, and lesions are progressive, we have surgical means of putting the lung at rest. The three chief methods are phrenicotomy, artificial pneumothorax, and thoracoplasty. The first cuts down lung function by paralysis of the diaphragm, the third by reducing the size of the bony framework, but the second, the subject of this paper, induces rest by reducing the available space which the lung can occupy in the chest cavity, leaving the diaphragm and chest wall in condition for function later on if desired.

In 1820 James Carson of Liverpool discussed the possibilities of artificial pneumothorax, but Carlo Forlanini of Milan, in 1882, was the first to perform the operation.

The indications are primarily progressive caseous lesions in one lung, although contralateral disease is not a barrier, for example, hemoptysis, spontaneous pneumothorax, and tuberculous pleurisy with effusion. Contraindications are renal or cardiac failure, extensive emphysema, tuberculosis of the larynx, or of the intestine sufficient to interfere with the patient's nutrition.

A survey of 600 cases collected by Matson over a period of twelve years throws interesting light on the worth of the proceeding. In those patients where a satisfactory collapse of cavities and adequate functional rest could be obtained, 48 per cent made clinical recoveries, eighteen were arrested, twelve improved, or unimproved, and twenty-two were dead. Where the collapse was poor due to adhesions, 11 per cent were clinically well, twelve arrested, nineteen improved or unimproved, and fifty-eight were dead. A third set of cases, used as controls, where no air could be introduced, showed after prolonged sanatorium treatment, 5 per cent clinically well, nine arrested, twenty were improved or unimproved, and sixty-six were dead.

The procedure is that of a thoracentesis, except for the injection of air into the pleural cavity, rather than the removal of fluid. Water in one large bottle is allowed to syphon over into another, forcing the air above it out through the tubing and needle into the chest cavity. The amount of air injected can be read on a scale on the bottle as the number of cubic centimeters of fluid run through the syphon. A manometer can be let into the tubing system by stopcocks to show the intrathoracic pressures at any time during the process. To understand the theory a little better, let us look at the anatomy and physiology of the chest. It is divided into two parts, surrounded by the ribs and movable diaphragm, and separated by a more or less movable partition, the mediastinum. Each half contains a lung communicating freely with the atmosphere through the bronchi and trachea. When the volume of the chest increases by raising the ribs and depressing the diaphragm, if the lung should remain stationary, a vacuum or negative pressure would be created between the lung and chest wall. The atmospheric pressure, acting through the trachea, pushes the lung out to overcome the negative pressure, and the result is inspiration. When muscular effort relaxes, the elastic tissue in the lung itself is no longer opposed in its contracting, and it forces out the inspired air through the free air passages. If the chest wall and diaphragm remained fixed, another vacuum would obtain between lung and chest wall while the lung contracted. The negative pressure, however, pulls the chest wall in and diaphragm up, and this more passive phase of respiration constitutes expiration. The negative pressure prevents the pleural space from becoming more than a potential one. It is this innate contractility of the lung which is made use of in artificial pneumothorax.

When nature attempts healing of a tuberculous lesion in the lung, the elastic fibers play an important part. Fibrosis initiates the healing process, and, as it progresses, a certain amount of local atelectasis obtains. With the local atelectasis there is a radiating pull on all the surrounding elastic fibers, which is transmitted to the lung tissue in the vicinity. As a result of this pull the adjacent areas undergo a compensatory emphysema in order to replace the loss of air space, and make up for the decrease in lung volume. The tenting of the diaphragm,

*Read at the Annual Meeting of the New Hampshire Medical Society at Manchester, May 26, 1936.

†Spring, John D.—On Staff of Memorial and St. Joseph's Hospitals, Nashua, N. H. For record and address of author see "This Week's Issue," page 563.

seen occasionally in roentgenograms of tuberculous lungs, is considered to be due to this local atelectasis before a compensatory emphysema has taken place.

Where one lung contains much involved tissue, this combination of atelectasis and emphysema shows up more markedly. The mediastinum deviates toward the diseased side, with emphysema present in the good lung. In a pneumothorax, this atelectasis is forced on the lung from without, rather than waiting for nature to do it by fibrosis.

Atelectasis has a systemic as well as a local effect. The circulation through the area involved is cut down, with a resulting diminution of absorption from the diseased portion, and a consequent clinical improvement. This is the reason for the rapid improvement in patients who are started on the treatment.

Since it is the negative pressure in the chest which holds out the lung, anything in the chest cavity to take up some of the space would leave that much less for the lung to occupy when the negative pressure is overcome. This is the simplest statement of the theory. Our time is far too short to consider all the effects on the collapse of the pull of adhesions, mediastinal swing, selective collapse, and other factors which enter into the procedure to make each case an individual problem. It is this complexity of an apparently simple problem which requires control by manometer readings, the fluoroscope and roentgenograms.

Prolonged continuation of the lung collapse will produce characteristic intrathoracic changes. The pleura, which is apt at first to be irritated by the air, with the development of an effusion, especially in the first four months, gradually thickens, so that effusion is less likely, and absorption of the air is less rapid, giving a longer interval between refills. The amount of air absorbed at first is about 85 to 100 cc. a day, but this will go down to 25 to 30 cc. a day after a few weeks. One man I injected had been taking the treatment for several years, and each six weeks when he had his refill, 100 cc. made him uncomfortable.

The most characteristic changes, of course, are in the lung. At first there is only a small degree of collapse, and the lobes can be seen under the fluoroscope to be still functioning. As the mediastinum stiffens, and the mean negative pressure becomes less, the lung becomes more firm and less aerated, until it is a fairly solid mass on the lung root. Cavities in the lung become likewise compressed, and on following them with the fluoroscope and chest plates, they will of course hold out the adjacent area of the lung and lengthen the time of treatment, since they stretch slowly, if at all, in most cases. Obliteration of cavities favors fibrosis and local atelectasis, so that eventually, when the lung can be allowed to expand, the cavity has been replaced by a nodule of scar tissue in the ideal case.

Intrathoracic conditions are largely gauged by the manometer, even more than by the fluoroscope, and various factors influence the readings. The calibre of the needle is important. Other things being equal, a smaller needle will give a lower reading than a larger. Posture of the patient also has its influence. The readings have been found to be higher in the dorsal than the lateral position.

Temperature has sometimes a marked effect. Cold air injected into a patient will raise the reading when it is warmed to the patient's own temperature. I remember one man who had his refill one hot July day. Though told to keep in the shade, he knew better. Just before supper we had a hurry call to his cottage. He had been lying on his cure chair in the sun all afternoon, and the air had been warmed and expanded. We had to remove some of his air, so that the poor fellow could breathe again.

Barometric pressure sometimes has an influence. A rise of five thousand feet in altitude will give about 20 per cent more volume to the same charge of air at sea level. While few patients change altitude so rapidly, it sometimes makes a difference. A patient who was referred to me during the summer was staying in a town about nine hundred feet higher than ours. He told me once that after a refill which had given him no trouble in the office, he was acutely uncomfortable that night and the next day. This was undoubtedly the effect of altitude.

The optimum pressure for treatment has always been a disputed question. Forlanini originally advocated high positive pressures to insure immobility of the lung. Murphy of Chicago gave three thousand cubic centimeters of air at the initial treatment, but apparently gave no further air. The general practice now is to give enough air to bring the pressure to a slight positive, so that the mean pressure will be a low negative one. By this means the lung will collapse readily without discomfort to the patient, and what is more important, there is little if any danger of rupture of adhesions.

Frequently in a tuberculous patient there is a condition of vesiculation in the mediastinum, reported in the literature as a small pneumothorax, due to the extravasation of air. The radial contraction of the elastic fibers about the tuberculous lesion, forming a path of least resistance for it, causes it to work its way along the root of the lung, accelerating the local atelectasis. From this phenomenon Morgan developed his idea of selective collapse. In this a small amount of air is given, which works its way along the surface of the lung toward the lesion, and gives a collapse similar to that in the small pneumothorax. This has the great dis-

advantage that each refill is practically an initial treatment, with increasing likelihood of adhesions due to pleural trauma. A selective type of collapse can be observed, however, in many cases, as the more diseased lobes, unless held out by adhesions, often contract faster than others with more normal tissue, which can be seen still functioning under the fluoroscope.

A treatment of this kind, with its frequent pleural punctures, of course has its dangers. First of these is the so-called "pleural shock", considered by some to be of neurogenic origin and by others to be due to air embolism. If plenty of novocain is used, and the needle is found to be in the chest cavity before injecting air, this danger is not serious. It is infrequent.

Pleural effusion, while common, is not usually dangerous. Rupture of adhesions, however, with uncontrollable hemorrhage, or discharge of the contents of a cavity, is far more serious. This is usually due to high positive pressures in the attempt to stretch an adhesion, so in this case the manometer should give warning.

Discharge of the contents of a collapsed cavity to infect the contralateral lung by the bronchiogenic route, while possible, is less likely to cause such an infection than the constant raising of positive sputum from the uncollapsed cavity.

A procedure with all these dangers must have some advantages to offset them. As the figures quoted above would show, a patient with a good collapse stands a better chance than one without. While not all cases are suited to the treatment, still it has saved many thousands of lives, and restored to usefulness many patients who otherwise would have had to spend the larger part of their lives either in bed or in a state of chronic invalidism.

As examples of the results of the treatment, the following may help to show some of the points stressed above.

Miss A., a nurse in New York, became much run down and overtired. She developed a chronic cough, which became productive. On examination the sputum was found to be positive for tuberculosis, and chest films showed multiple cavitation in one lung with beginning mottling in the other. She was sent to our sanatorium by ambulance, and pneumothorax was instituted as soon as possible after admission. At the end of two weeks the cough, which had been practically constant on admission, was rare, there was only a slight amount of sputum, and the temperature was normal except for an occasional slight afternoon rise. A month after admission she had been discharged from the infirmary to a cottage, and was walking to meals. The collapse was maintained fairly completely, the cavities closed well, and a year after admission she was discharged as arrested, to continue her refills in New York.

Mr. D., a young engineer, developed a chronic cough which did not improve. After he began to lose weight and strength, and the cough became productive, the sputum was found to be positive, and chest plates showed a large apical cavity on the left side. He was put on complete bed rest, but as improvement was not marked, pneumothorax was started. A series of chest plates showed the large cavity becoming progressively smaller, and a band adhesion over it to the apical chest wall could be observed stretching and becoming narrower. His general condition improved in direct relation to the closure of the cavity, and the cough practically ceased, the sputum stopped, and he had a steadily normal temperature. He was sent to me for refills during the summer, and is still receiving the treatment, but should be able to resume his work soon.

Mrs. M., a young housewife, a former nurse, developed a pneumonia about the end of 1934, from which she recovered except for a chronic cough. Six months later her condition was worse, and she spent seven weeks in a hospital. At that time the sputum was found to be positive, chest plates showed disease in the right lung. Home treatment was attempted, but after a summer spent in a bathing suit, the cough and sputum were still present and her general condition continued to become worse. Chest plates taken during that fall showed beginning cavitation in the right lung, with some involvement of the left also. She was continued on bed rest, and was finally referred to me for a pneumothorax. In spite of the cavitation in the right lung, only one adhesion at the apex was found to be holding it to the chest wall, and a good collapse was initiated. She was treated in the hospital until arrangements could be made for her to go to a sanatorium. While the first two or three treatments gave her a little discomfort, she had no further trouble from the injections. Her general condition improved almost miraculously, the cough ceased, sputum was limited to an occasional slight morning expectoration, and her temperature stayed consistently normal. Before she left for the sanatorium, chest plates showed the cavities becoming smaller, and the disease in the opposite lung was apparently improving. Her ultimate prognosis is now good, although she will have to continue the treatment for several years.

These cases, and many similar ones, all speak for the efficacy of artificial pneumothorax as a therapeutic measure. Until a specific attack can be made on the causal organism in tuberculosis, this type of treatment will undoubtedly remain well to the fore in the armamentarium of medicine's fight against pulmonary tuberculosis, due to its relative simplicity, and great effectiveness in suitable cases.

DISCUSSION

PRESIDENT ABBOTT: Discussion on this paper will be opened by Dr. Robert B. Kerr of Manchester.

DR. ROBERT B. KERR: Dr. Spring and this Society are to be congratulated upon this most comprehensive and enlightening exposition of a very important and timely phase of treatment of tuberculosis. This paper is particularly timely in view of the widespread interest in and increasing utilization of pneumothorax treatment of the disease. The increasing use of pneumothorax has assumed sufficient proportions and achieved results which warrant the belief that this form of collapse therapy has a permanent place in the treatment of carefully selected cases of tuberculosis.

Dr. Spring's presentation of the subject impressed

me particularly because of the spirit of conservatism displayed throughout its entirety, for I feel that not all cases are suited to this form of treatment, and as Dr. Spring points out "pulmonary tuberculosis presents different aspects in each patient so that each case must be judged on its own merits or perhaps we should say demerits".

Dr. Spring has presented a splendid outline of the indications, contraindications, dangers, results, and technics of pneumothorax. There is but little that I can add to this valuable paper.

I well remember my first introduction to artificial pneumothorax. It was in the early summer of 1914. I had learned that Dr. Balboni of Boston was carrying out this form of treatment upon ambulatory tuberculosis cases at his office on Blackstone Street in the market section of Boston. I visited Dr. Balboni, witnessed his carrying out of artificial pneumothorax upon several cases, and was much impressed by his enthusiasm. Dr. Balboni had recently returned to Boston from a visit to his native land, Italy, where he had met Carlo Forlanini—learned of his work with pneumothorax—studied its technic, and brought back with him a pneumothorax apparatus. Previous to this, this method of treatment had been instituted in this country by Tice and Murphy. Although the procedure seemed to be successful in the hands of these men, it was not generally adopted and it had waned with occasional spurts of interest and enthusiasm until within the past five or ten years. Undoubtedly the development of the x-ray in diagnosis and follow-up study of the chest, combined with efforts of an enthusiastic group of chest surgeons, has revived interest in pneumothorax with most encouraging results.

It is well known that artificial pneumothorax should not in any sense be considered a cure for tuberculosis. It is simply an adjunct to the routine bed rest, hygienic and dietetic treatment.

The cure of tuberculosis has only been achieved when the diseased lung tissue has been absorbed or fibrosed. The results of pneumothorax treatment cannot, therefore, be fully evaluated until after the compressed lung has re-expanded. Then the physical examination and x-ray evidence can be studied to demonstrate whether the cure of the pathology has or has not occurred. Pneumothorax treatment cannot be said to be fully successful until it can be demonstrated that absorption or fibrosis of the tuberculous process has resulted, and this result is evident upon re-expansion of the lung.

Artificial pneumothorax has come into wide use, and unfortunately the risks and dangers of it are not generally realized. The technic is simple but requires the utmost precision and thorough knowledge of pulmonary tuberculosis. Various degrees of collapse can be maintained. The success of this form of treatment is dependent upon the degree of the collapse achieved. It has been demonstrated that the more complete the pneumothorax the more successful the results. The fluoroscope and x-ray now are of inestimable value in outlining the degree of the collapse and hence enable the physician to make this form of treatment more successful.

The proper selection of cases for pneumothorax treatment imposes upon the physician a most serious responsibility.

The tragedy of the contralateral lung is too frequently a source of keen disappointment and chagrin. The disappointment is most keen in these cases where a formidable disease process has been brought under control, perhaps brilliantly, and then unheralded and many times with dramatic suddenness there appears an acute spread in the contralateral lung. This is particularly true when the contralateral lung was shown by all the means at our command to be free of disease. The presence of an already existing lesion in the "good" lung imposes upon the physician in charge the necessity of exercising sound judgment and meticulous caution, particularly when it is remembered that approximately thirty to forty per cent of all pneumothorax procedures are followed by pleural effusion. This sound judgment and meticulous caution can accrue only from a wide experience and a basic intelligence. To overlook the presence of a contralateral lesion and the failure subsequently to evaluate its potentialities cannot, of course, be condoned. Suffice it to say that occasionally in the fervor of organizing the attack against an extensive disease, it happens. The aggravation and at times devastating spread of this lesion may follow the application of unwise, perhaps too radical, collapse measures upon the diseased side. When a lung is collapsed, partially or totally, there is imposed an added burden of function upon the opposite lung. The opposite lung, then, has to carry on in great part the respiratory load. It is obvious therefore that the integrity of this lung could be definitely and decidedly threatened did it contain a diseased process.

With the advent, and during the earlier days of pneumothorax treatment, a nominal lesion in the contralateral lung was considered the limit of safety. Anything more than this portended grave danger and contraindicated pneumothorax treatment.

A perfectly clear lung was preferred. Today, with a wider experience, with the application of low tension selective collapse and perhaps augmented by a bolder attitude, many more liberties are taken and certain types of cases with bilateral disease are being given pneumothorax. But, there is always a decided uncertainty in these cases. In the consideration of the proposed collapse procedure for the "bad" lung, just how little or how much will the contralateral lung stand; just how slight or extensive a pathologic involvement will it permit?

To answer these questions is frequently quite difficult, and the solution of the problems raised demands experience, judgment and intelligence. Even then, too often, failure proves the error.

As Dr. Spring has stated, each case studied for pneumothorax "should be judged on its merits or perhaps we should say demerits."

PRESIDENT ABBOTT: This paper will now be discussed by Dr. Robert M. Deming of Glencliff.

DR. ROBERT M. DEMING: I have greatly enjoyed hearing Dr. Spring's paper and feel that congratulations are in order, since this paper received the Pray and Burnham prize for this year.

Several thoughts relative to artificial pneumothorax occur to me. The aim of any collapse procedure is to produce the greatest amount of lung rest with the least possible amount of physiologic derangement and the smallest possible ratio of permanent impairment, either functional or anatomic. Understanding that the lung expands and contracts at least twenty-five thousand times in a twenty-four hour period, and knowing that bed rest alone will but slightly lower this rate of movement, the reason for an air splint, or pneumothorax —a simple procedure—seems obvious.

There are some men in tuberculosis work, as in any other field of endeavor, who become enthusiastic about everything and anything at one time or another, and consequently either overdo or underdo and criticize their results accordingly. Pneumothorax has been used by some, at some time, for all cases regardless of the amount of lung involvement; not used by some at any time; and used in selected cases by others. It rightfully belongs in selected cases only, although there are some con-

ditions where anything is worthy of a trial regardless of the classical indications. Pneumothorax, as Dr. Spring well states, is not a "cure-all" for pulmonary tuberculosis, but, given equal indications and conditions, it is the primary operation of choice.

To Dr. Spring's indications for its use I must add, and strongly emphasize, the finding of positive sputum as the number one indication. Placing this first in any classification does not actually imply priority of indication or greater suitability. It merely serves to affirm the conviction that the positive sputum in itself, given the conditions, is sufficient indication for any procedure which may prove adequate to its conversion. Conversely, the conversion of sputum from positive to persistently negative, following pneumothorax treatment, is rather proof positive of its usefulness from a clinical standpoint.

It is a simple procedure, but properly to protect the patient and ourselves from being respectively overdone and overdoing, routine x-ray plates and occasional fluoroscopic examinations should be available and used.

At the Sanatorium at Glencliff we have been doing "pneumos" for about nine years, have performed around seven thousand initial and refill operations, and are averaging now around twenty per week. Approximately 60 per cent of our patients are receiving, or have received, some form of collapse therapy during the past four years. Of seventy-five individual patients on whom pneumothorax was attempted, during the past two years fifteen were unsuccessful due to no space being available or pleural adhesions being present to such an extent that a satisfactory collapse was not possible. I might add that, whereas originally it was felt that a complete collapse with strong positive pressures was essential, we now use negative pressures for the most part and are reasonably content if but a partial collapse, if more or less selective, results.

More and more I am inclined to consider pneumothorax, in the late moderately advanced cases, even though unilateral, as a more or less experimental procedure to determine the effectiveness of collapse therapy. If successful, that is if the sputum is converted, I doubt very much if the lung will fully re-expand, and again there arises the question whether it is wise to allow it to re-expand because of the possibility of the healing of the scar tissue being broken. I am inclined to believe that, in these cases, a permanent form of collapse should be very seriously considered.

Of seventy-six patients, during the past two years, for whom pneumothorax was indicated, those strictly unilateral or those who had predominantly unilateral lesions, the following figures may be of interest in comparison with those given by Dr. Spring: For fifty-five patients, pneumothorax could be given with a successful result from a technical standpoint. Of this number twenty-six, or 34.21 per cent, were apparently arrested and clinically well; seventeen, or 22.38 per cent, were improved; eight, or 10.54 per cent, were unimproved; four, or 5.26 per cent, were dead. Of the twenty-one for whom pneumothorax was indicated but for whom for various reasons it could not be carried out, four, or 5.26 per cent, were apparently arrested and clinically well as compared with twenty-six in the above statistics; four, or 5.26 per cent, were improved as compared with seventeen; five, or 6.57 per cent, were unimproved as compared with eight; and eight, or 10.53 per cent, were dead as compared with four in the preceding figures.

While the purpose of all treatment is to get the patient home, no longer a menace to himself and his associates and able to be gainfully employed, the collapse therapy if successfully introduced will allow the patient to continue treatment at home and so, not only relieve congestion in the Sanatorium, but make him happier and more contented. One difficulty in New Hampshire is that there are only a comparatively few men prepared to give "pneumos" and they are somewhat scattered around the State; and secondly, financial distress has made necessary routine x-rays and fluoroscopies most difficult for the average tuberculosis patient to arrange for. I have high hopes that an increasingly larger number of physicians will qualify themselves to give pneumothorax treatments, be prepared to give them at a nominal fee, and that through them equitable arrangements for routine x-rays may be arranged.

PRESIDENT ABBOTT: The paper is now open for general discussion.

DR. FOSTER of Manchester: I was very much interested in this paper covering the treatment phase of a disease so prevalent among the inhabitants, not only of New Hampshire, but of the entire country.

There are three or four points relative to this that I thought perhaps had been overlooked, or had not been brought out emphatically enough.

Back in 1908, I was attending a clinic at St. Luke's Hospital in Chicago. Dr. John B. Murphy had just then brought out his apparatus for artificial pneumothorax. I became interested in it and took one home and have been using it sporadically since 1909.

I find that the technic of introducing the trocar needle into the pleural cavity is a very important part of the treatment, and that a great deal of damage can be done if this technic is not properly carried out. The sensation brought to the finger tips by repeatedly doing this is the guide. This damage can be greatly emphasized when done in cases where there are colonies of active ulcers.

I also feel that the treatment should never be given in the presence of active hemorrhage. These cases should be put at rest and remain so until the hemorrhage has become quiescent, for at least one month.

I still feel that nitrogen is the sort of gas to use; not air, not oxygen, but nitrogen. It will last longer and will do the work much better, and in the presence of adhesions, it certainly serves as a much better and more effective part of the treatment of this disease.

I also feel that the amount of gas injected should be carefully watched, perhaps 25, 50 or 75, but not more than 100 cubic inches at any one time.

This treatment is nothing new for tuberculosis; it has been used successfully for a long time and has been effective in properly selected cases. I think at the present time, we are overdoing the surgical treatment of tuberculosis anyway, but here is a thing that may exert a very strong, as well as a favorable influence, in the treatment of tuberculosis. However, it has to be safeguarded in its technic and in its performance.

PRESIDENT ABBOTT: Is there any further discussion on this paper?

DR. LOUIS AGER: I think it is about twenty years since I did a pneumothorax. I did a few at that time and then stopped.

We used nitrogen at that time, but I am not aware that it is used at present. It was rather a crude operation then.

At that time, there was not much choice or knowledge of what cases were suitable for pneumothorax. We were trying to cure cases which it would be absurd to treat in this way nowadays, and we didn't know at the time that the air was going to escape again when we got it in. This is particular-

ly true with children, which renders it rather a hopeless procedure in such cases. But there are occasional cases of the adult type of tuberculosis in children in which it may be beneficial.

The reader of the paper gave us the technic but didn't go into other points very much. As Dr. Foster said, I feel very strongly that there is a tendency at the present time, to overdo the surgical treatment in tuberculosis. Dr. Alexander over at Saranac, a year ago, frightened everybody, when he said that they were not treating tuberculosis right because they were not using surgery. I don't agree with that at all. It is a selective procedure, and you, in your general practice and in your state and private sanatoria, will see many cases in which it is a highly unnecessary treatment.

A fact which I believe was very encouraging was the statement that more men should be able to carry on this procedure in New Hampshire. Early diagnosis is the essential thing, and the treatment in the early stages, in a large majority of cases, should not require pneumothorax.

Dr. Foster made one statement that rather astonished me, that pneumothorax was contraindicated in hemorrhage. It is the one and only successful treatment I know of for severe hemorrhage.

PRESIDENT ABBOTT: I am going to call upon Dr. Spring to close the discussion on his paper at this time.

DR. JOHN D. SPRING: There are various things, of course, that we could not bring out in a paper the length of this one. Really to discuss this and go into detail about the matter wouldn't leave time for any other speakers at this meeting of ours. So, we had to cut it down somewhat. Consequently, there are a great many things that have been left out.

Dr. Kerr said that not all cases are suitable for this type of treatment. You have to use your own judgment with each particular case, and sometimes, when you think a case is a good one for treatment, you may find yourself in error afterwards.

In the particular case whose slides were shown, we were doubtful at first, due to the amount of disease in the lung, as to whether we would be able to get any air into the chest, but we were fortunate in being able to collapse that lung fairly well. Incidentally, according to the last report of the sanatorium, she has gained twelve pounds since she left us; apparently the treatment isn't doing her any harm, or maybe she is getting more to eat.

As Dr. Kerr said, the adoption of this type of treatment has been slow. It goes back to 1822 when Carson first thought about it in a constructive way. He did try it on one case and did it by cutting down onto the pleura and trying to let air in. He was very unfortunate in the case he happened to choose and in the place he selected for the operation in this patient, and wasn't able to get any air in because the lung was tied down tight. So the adoption of this method has been very slow.

Forlanini studied it in 1882, and did his first cases in 1888, and reported them in 1894.

Morgan thought about this problem in 1913 or 1914, but it wasn't until ten years later that it was being done.

When I was first doing this out at Loomis, that was one of the two or three sanatoria in the country where much of it was being done. There was one place out in California, where it was fairly well used, and then in our place, we were doing in the whole sanatorium around fifty to seventy-five a week. They do it a lot more there, now, but of course all of these patients have to be selected cases. You can't apply it to all of them.

In the case of disease in the contralateral lung, as far as I have noticed, in all of these cases I have ever seen, if they have contralateral disease and a good collapse can be obtained in the worse lung, the other lung very often will improve, of itself, and even if it doesn't, sometimes fairly good results can be obtained from a bilateral treatment, where both lungs are given small amounts of air alternately so as to give a moderate amount of selective type of collapse which you noticed there in the slides, where one of the lobes came down pretty well and the other was working. In such a case, these patients would very often do fairly well on small collapses in both lungs, when given alternately.

As Dr. Deming has said, positive sputum is a good indication. In fact, it is a primary indication, because you usually find the positive sputum in these cases which are good ones for the treatment anyway. It is a lot handier for the patient, particularly if he has to pay his way in the sanatorium, to go home with his lung collapsed and held down by refills, than it is to stay at the sanatorium and pay $25.00 a week, or whatever it happens to be. So that if he can go around to the sanatorium every week or ten days or two weeks and have a refill for $5.00 it is much more convenient for him.

Dr. Foster spoke about technic. Technic is a whole volume in itself. There is a type of needle which is used for introduction of the air, and it is much better than the usual Wassermann or spinal needle which is sometimes used. The Floyd needle is a Y-shaped piece of apparatus, with a piece running down through the center, and has a fairly shallow or blunt bevel; that needle can be used very successfully in the initial treatments, where the skin and muscle down to the pleura are well infiltrated with the novocain, and then the skin is nicked with the point of a scalpel. This needle can be introduced, and as it goes through the pleura, the click can be felt. As it punctures the parietal pleura, it tends to go only through that and not through the lung pleura, which will be shoved ahead of the needle. If you feel that go through, holding the needle in your fingers, you can stop your needle from going farther, and then inject a little air. Then try it with your manometer, to make sure you are in the pleural space.

Of course, if we wanted to go into the technic in detail, that would be a long job.

The frequency of refills, of course, depends upon the amount of absorption that the patient will carry out. We usually find that, at the start, these patients should be given air every two or three days. It can be cut down finally so that they are getting it every week, every ten days or every two weeks. Giving a patient air every two or three months sometimes allows him to absorb too much, and the cavities will tend to expand. Then all your good work will be wasted.

The use of nitrogen is a question. It costs more than ordinary air, which we can gather from the surrounding atmosphere, without any trouble.

There is a recent article which I noticed in some German magazine, in which the author gave tests of the pleural contents in several cases of pneumothorax that had been having nitrogen, others that had been having air, and some that had been having various other gases. After this air or gas had been in for a certain length of time, the oxygen in the air had absorbed, or in the case of the nitrogen, a certain amount of oxygen had been accumulated in the pleural cavity. The end-result in these patients is all the same in the proportion of gases. So the use of nitrogen is all right, if you wish to pay for it. However, very often, it doesn't work any better.

We do have to watch the amount injected, because if you give these patients too much, frequently they will have a lot of pain, particularly at the apex of the mediastinum, where there is a certain lateral pull on it from pressure. Sometimes, particularly in the early cases, that is very painful to these patients.

Sometimes, there does seem to be a little too much surgery in tuberculosis, but here again, we have to use judgment in the selection of these cases. Not all of these cases, by any means, are good ones for a pneumothorax. Sometimes, if we think they are doubtful, it doesn't do any harm to give them the benefit of the doubt, and try air on them to see if they will collapse, because their chances, statistically, are a little better.

SEXUAL STERILIZATION IN NEW HAMPSHIRE*

BY SIMON STONE, M.D.†

THE problem of eugenics and eugenic sterilization has for some time attracted much attention in the United States and abroad. In Germany especially, where for political and social reasons sexual sterilization was proclaimed to be a panacea for the prevention of mental disease in future generations, it has been carried to extremes, both in practical application and in theoretical speculation on expected results. In England, a committee appointed for the study of the subject (British Departmental Committee for the Study of Sterilization) decided in favor of eugenic sterilization in selected cases, but suggested that the law be voluntary rather than compulsory. The present state of knowledge of inheritance of mental disease, members of the committee felt, does not warrant passage of legislation which will produce hardship on a large number of individuals, as it does in Germany, without actually producing any definite diminution in the incidence of mental disease in the future.[1]

In Canada, the Sexual Sterilization Act of Alberta was passed in 1928 (the first of its kind in the British Commonwealth) and provided for the sterilization of certain inmates in mental hospitals. Consent of the patient, parent or guardian is required before the operation can be performed. Besides, in order to safeguard against abuses, every case must be passed upon by a special board appointed for this purpose. Over 200 patients were sterilized during the first five years following its passage.[2]

The first bill for eugenic legislation in the United States was introduced and defeated by a small margin in the Michigan legislature in 1897. The first compulsory sterilization law was passed by the state of Indiana in 1907, but the statute was not put into active execution for a number of years. Ten years before the Indiana law was passed, Dr. Harry C. Sharp[3] of the Indiana State Reformatory performed surreptitiously the first vasectomy for the sterilization of an inmate of the school. He sterilized thus a number of inmates and should be credited with having been the first to utilize this operation for sterilization purposes.

Twenty-eight states in the Union have now on their statute books laws permitting sexual sterilization in selected cases. In several other states legislation is pending for the legalization of such procedure. The laws themselves and the force with which they are executed vary in the different states. In California, as a result of the efforts of several interested individuals, the law has been carried out to its maximum degree and up to the present over 10,000 sterilizations have been performed on patients in institutions or on individuals at large since its passage in 1909. In several states, where legislation permitting sterilization has been in force for a number of years, not a single sterilization has been performed as a result of laxity in taking advantage of the law. In the majority of states the law has been functioning moderately. At the end of 1935, over 23,000 sexual sterilizations of which records are available, had been performed all over the country, although probably many more operations have remained unrecorded.

Sterilization laws in New England have been passed in Connecticut, New Hampshire, Maine and Vermont. The first law in Connecticut was passed in 1909 and re-enacted in 1918. By the end of the year 1931, a total of 158 sterilizations were performed in the state. In 1925 the first law was enacted in Maine and re-enacted in 1931. The Vermont law was passed in 1931 and, in Rhode Island, legislation is still pending. In New Hampshire the first sterilization law was enacted April 18, 1917. It was amended April 14, 1921, and re-enacted April 18, 1929.

The movement for eugenic sterilization in New Hampshire received its original stimulus through the work of Dr. Charles P. Bancroft, Superintendent of the New Hampshire State Hospital from 1882 to 1917. For some time, he had felt that the subject of inheritance of mental disorders required more careful study and more attention than it was then receiving in state institutions, the logical places for such research. He obtained the service of trained investigators and succeeded in obtaining many data in regard to the heredity of certain patients, which he later used for the purpose of sponsoring satisfactory legislation in regard to sexual sterilizations. His discussion of his aims,

*From the New Hampshire State Hospital, Concord, N. H.

†Stone, Simon—Chief of Admission and Medical Units, New Hampshire State Hospital, Concord, N. H. For record and address of author see "This Week's Issue," page 563.

as revealed in his annual report for the year, 1912, is interesting. He wrote as follows: "In insanity, on the other hand, not one but many causes contribute to the development of mental illness. Prominent among these causative factors stands heredity. But heredity is not the single entity that one might at first think. For by heredity we need not necessarily mean some previous mental disturbance in some nearby ancestor. Heredity must be a much more inclusive factor than that. Alcohol in the ancestry, instability of the nerve structure, showing itself in emotionalism, hysteria, St. Vitus's dance, and even retarded action of the nervous system, exhibiting itself in dullness and stupidity, degeneracy and feeble-mindedness, all enter into the protean complex which we recognize as heredity. The study of the causes of insanity, especially of the hereditary beginnings of the disease, becomes, therefore, most vital to us if we propose to diminish its prevalence in the community. For this reason, the field work, which has been somewhat tentatively begun during the last year, assumes much importance. The field worker penetrates the remotest corners of the state, investigates the hereditary antecedents of the patients, studies the environmental conditions, searching out all contributory factors leading up to the mental outbreak in this individual case, and then carefully charts and tabulates the data. It is to be hoped that such detailed investigations carried out over a series of years will so illuminate the antecedents of insanity that society will be enabled thereby to accept some measures looking toward intelligent prevention."

The end-results of this study culminated in the passage of the first New Hampshire sterilization law. The original law was voluntary in nature and provided for the sterilization of the feeble-minded and patients suffering from certain types of mental diseases, in institutions and at large, with the patient's consent, when able to do so, or with the guardian's approval otherwise. Fifty-five patients were sterilized under the old law (1917-1929)—fifteen at the Laconia State School and forty at New Hampshire State Hospital.

On April 18, 1929, the law was modified and the voluntary clause of the previous law was removed. The new law states that "whenever the superintendent of any state or county institution shall be of the opinion that it is for the best interest of the inmate and of society that any inmate of the institution under his care should be sexually sterilized, such superintendent is hereby authorized to cause to be performed by some capable surgeon the operation of sterilization on any such inmate confined in such institution afflicted with hereditary forms of insanity that are recurrent, idiocy, imbecility, feeble-mindedness or epilepsy." The law requires that the inmate be examined together with the history and record by two physicians, who are registered in the state, of two or more years' practice and in no way connected with such institution or related to the patient. Their opinion together with the superintendent's is to be forwarded to the county commissioner or to the governing board of the institution. A copy of this decision is to be served upon the inmate and his guardian fourteen days before the board meets. The guardian or the inmate is given an opportunity to attend the hearing and voice objection to the operation before the board.

If the board decides that the inmate is insane, idiotic, imbecile, feeble-minded or epileptic, and, by the laws of heredity, is the probable potential parent of socially inadequate offspring likewise affected, that the inmate can be safely sterilized without detriment to her or his health and that the welfare of society will be promoted by this sterilization, the operation can be carried out after an interval of thirty days—stipulating that nothing in this act shall be construed to authorize the operation of castration or the removal of sound organs from the body. The family or guardian is permitted to appeal to the Supreme Court within fourteen days of the time the order was issued.

Since the law was amended, 255 new sterilizations have been performed. Of this number 115 were performed at the New Hampshire State Hospital, 91 at the Laconia State School for Feeble-Minded and 49 at the various county farms in the state. A total of 310 sterilizations have been performed since the original law was passed in 1917. Half of this total, or 155 operations, were performed at the state hospital, 106 at the Laconia State School and 49 at various other hospitals. Forty-four of the operations were performed on males, the number divided equally between the state hospital and the state school, and the other 266 sterilizations on females. So far the law has not been challenged in court.

DISTRIBUTION OF THE CASES

The largest number of sterilizations, as evidenced from the figures above, have been performed in state-controlled institutions. Of the total sterilizations performed in county institutions, nearly half (22) were performed in one single county, and no sterilization operation has ever been carried through in half of the counties of the state. The initiative displayed in taking advantage of the law varies much with the county authorities. As one social worker observed, it was not always the lack of financial means that prevented the operation from being recommended in some county institutions. Frequently the objections were religious and moral, although the usual apologies of crowded conditions in the county hospital were offered as an

excuse. When the issue was brought up again before the county authorities, it was usually sidestepped and, in such instances, the facilities of the state hospital or state school had to be used.

In a reply to a questionnaire sent out to the superintendents of the various county institutions in regard to the reasons they found that warranted their suggesting the operation, the following answers were obtained. One wrote, "Besides the cases already covered by law, also where the husband and wife, due to economic conditions, request the operation, feeling that they are unable to assume further responsibility." "In cases where there are large families without sufficient means; in cases of incorrigibility and illegitimate children," were the reasons given by another county executive. "In all females with a sexual history back of them who are admitted to any institution supported by the taxpayer," was given as a reason in another county. According to the replies to the questionnaire, all patients sterilized in the county institutions were able to leave the institutions after the operation.

In the School for Feeble-Minded in Laconia where 106 sterilizations have been performed Dr. B. W. Baker, the superintendent, has summarized succinctly the following reasons for carrying out the operations on selected inmates of the school. The operation is suggested "in those in which family history indicates potential transmissibility of hereditary defect or disease; in those capable of self-support if unhampered and in those having families, who will support them. Briefly, those who can, if excused from child-bearing, care for themselves, enjoy greater social freedom and excuse the state from their support and from the support of their defective offspring."

Of the 106 cases sterilized at the state school, 86 were discharged from the school, 13 are on parole, and 7 still remain in the institution. Lack of funds, Dr. Baker states, makes it impossible for him to recommend the operation in many more patients for whom he thinks it is indicated. If these could be performed, a larger number of patients would be given parole privileges and also better opportunities for obtaining jobs after their discharge from the school.

The first sterilization operation in the New Hampshire State Hospital was performed on February 29, 1916, on a mentally deficient patient with her own consent for the operation. Since then a total of 154 sterilizations have been performed—132 on females and 22 on males. Forty patients have been operated on under the old "voluntary" statute (1917-1929) and 114 patients since the new law went into effect. The following table gives the number of operations performed each year since the first operation was carried out, of which a record is available.

TABLE 1

YEARLY NUMBER OF OPERATIONS PERFORMED

1916	1	1926	2
1917	0	1927	2
1918	1	1928	7
1919	4	1929	0
1920	0	1930	19
1921	5	1931	20
1922	7	1932	20
1923	1	1933	8
1924	6	1934	33
1925	4	1935	14

The operations consisted of 132 salpingectomies, 22 vasectomies and 2 orchidectomies, the latter 2 operations having been performed following the vasectomies at the patient's request and with the family's consent.

The age of the patients extends through the entire reproductive cycle. Five patients sterilized were below the age of 15 and one patient was over 45 years old at the time of the operation. In the younger patients and in those above the reproductive age, a definite indication for the operation was found at the time of the sterilization by the examining physicians.

TABLE 2

AGE GROUPS OF STERILIZED PATIENTS

Age	Female patients	Male patients
11-15 years	5	0
16-20 years	23	4
21-25 years	30	8
26-30 years	27	7
31-35 years	34	0
36-40 years	8	1
41-45 years	4	1
46-50 years	1	1
Total	132	22

Following the operations, 87 out of the 154 patients sterilized were able to leave the hospital in a recovered or improved condition. As seen from table 3, the percentage of discharges varied with the diagnostic subgroup. As usual, the largest number of mentally deficient individuals without psychosis were able to leave the hospital. Of this group, 70 per cent are out of the hospital, making a satisfactory adjustment with or without supervision. In the psychotic groups, 19 out of 23 manic-depressives are out of the hospital; also more than 50 per cent of the catatonic schizophrenics were able to leave. As can also be seen, the mentally deficient group with 51 patients makes up one third of the number sterilized and the schizophrenic group nearly another third.

TABLE 3

DIAGNOSES OF STERILIZED PATIENTS, AND NUMBER REMAINING IN AND DISCHARGED FROM THE NEW HAMPSHIRE STATE HOSPITAL

Diagnosis	Total	In	Discharged
Paresis	5	3	2
Psychosis with other somatic diseases	3	2	1
Psychoneurosis	3	2	1
Psychopathic personality	6	6	0
Paranoia	1	0	1
Epilepsy without psychosis	9	4	5
Epilepsy with psychosis	5	3	2
Involution melancholia	2	1	1
Mental deficiency without psychosis	32	11	21
Mental deficiency with psychosis	19	10	9
Manic depressive, manic	19	4	15
Manic depressive, depressed	4	0	4
Dementia praecox, catatonic	33	16	17
Dementia praecox, paranoid	6	3	3
Dementia praecox, hebephrenic	5	2	3
Dementia praecox, simple	2	0	2
Total	154	67	87

HEREDITARY FACTORS

A review of the family histories as obtained from the records and other sources gave the following data in regard to the various diagnostic groups that were sterilized at the New Hampshire State Hospital.

Out of a total of 51 mentally deficient patients, in 36 a definite family history of mental deficiency or psychotic episodes was found in either the patients' antecedents or other members of the family. In 7 instances the family history was unknown and in 8 cases the family history was recorded as negative by the admitting physicians. Chronic alcoholism in 1 or more parents was noted in 8 cases, and, in 15 patients, mental deficiency was recorded as having been found in siblings. In 8 instances frank psychoses were reported. Two of the patients had parents who were syphilitic, but the patients themselves exhibited no signs of syphilis. One patient in this group was a congenital luetic. A psychotic hereditary history was found twice as often in patients diagnosed mental deficiency with psychosis as in those without a psychosis. In one instance a mother and her daughter were both sterilized, the mother after she had given birth to 2 children, both feeble-minded.

In the dementia praecox, catatonic group a psychotic history was found in other members of the family or antecedents in 8 out of the 33 cases. Alcoholism in the parent was reported in 2 cases. The family history was reported as unknown in 8 cases and as negative in 15 cases.

In the paranoia and paranoid dementia praecox groups, only 2 out of 7 cases reported a negative family history. In one case suicide occurred several times in the family and frank psychoses have been reported in other members of the family. One sterilized patient and her mother, suffering from a similar psychosis, are confined at present in the hospital.

In the hebephrenic group a positive family history was obtained in half the cases.

Of the 23 manic-depressive patients a psychotic family history was obtained in 4 cases, alcoholism in one or more parents in 2 cases, a negative family history in 10 cases and unknown history in 8 cases.

In the epileptic group a history of epilepsy, mental deficiency or psychosis was obtained in 50 per cent of the cases. In 3 cases the family history was unknown.

A negative family history was found in the 5 paretics sterilized.

SEX HABITS OF FEMALE PATIENTS

Seventy of the 132 female patients sterilized were married, 5 were divorced or separated at the time of the sterilization and 57 were single. Among the single patients, sexual delinquency and illegitimacy were most frequently found in the mentally deficient group. Nine out of 25 single, mentally deficient females gave birth to a total of 15 illegitimate children. There were 3 mothers of illegitimate children reported in the 10 epileptics and a similar number among the catatonics. Out of 3 single manic-depressives sterilized, one case of illegitimacy was reported.

Table 4 gives the number of children born before operation to each married patient, arranged as to major diagnostic groupings.

TABLE 4

NUMBER OF CHILDREN BORN TO MARRIED PATIENTS

Diagnostic group	Total sterilized	Number of mothers	Total children born	Average children per mother
Mental deficients	16	13	54	4.2
Schizophrenics and catatonics	17	15	43	2.9
Hebephrenics	4	3	12	4.0
Paranoids	5	5	16	3.2
Simple dementias	2	2	6	3.0
Manic-depressives	17	15	52	3.5
Paretics	2	2	7	3.5

The average number of children given birth to by each sterilized married patient before the operation was 3.4.

SELECTION OF PATIENTS

The selection of patients for sterilization in mental hospitals is by no means a simple procedure if both the rights of the patient and the rights of society are to be safeguarded. About 50 per cent of the patients admitted to mental hospitals are within childbearing age.

Too liberal interpretation of sterilization laws and too drastic attempts at their execution may result in the law being so applied as to include nearly half of the total hospital admissions as cases suitable for sterilization. As a matter of fact, if closely analyzed in the light of our present actual knowledge of genetics and eugenics, only a very small number can be set apart as certain parents of socially inadequate offspring, providing that unsatisfactory environmental factors are not considered in themselves as a reason for sterilization. There stands out, however, a certain group where the operation is definitely indicated for other rather than strictly eugenic reasons. The married woman who has given birth to several children and broken down mentally following every childbirth, even with a temporary, fleeting attack, should not be exposed to future dangers of conception any more than a patient suffering from tuberculosis or heart disease. Again, the married insane patient who is able to go home for a visit occasionally with her husband for indefinite periods and whose abilities to make permanent adjustment outside are limited, should also be sterilized as a prophylactic measure to prevent impregnation during any of her visits home. The runaway patient, whose sexual proclivities expose her frequently to the danger of becoming impregnated, would be much less of a problem to the institution after having been sterilized. This would include also the cases where a large family already demands the attention of a patient who has broken down mentally once, where another child would be an extra financial and mental burden and where the occurrence of another pregnancy would appear as a calamity. For the chronic alcoholic patient whose wife is unable to resist his advances during his states of intoxication, for the paretic (treated) and for many others this operation is indicated, primarily for other than eugenic reasons.

Excluding the cases mentioned above, where the needs for sterilization must be individually analyzed in every patient, universal application of the law to all patients in the hospital is only going to entail hardship and really unnecessary operations on many without benefiting society. At the same time it would cause additional expense to the state which already finds the budget of the mental hospitals a great burden.*

*The cost, to the state, of sterilization of a female patient including the examining physicians' and surgeons' fees, the appointment of a legal guardian, operating room expenses and other details, is seventy-five to a hundred dollars. If this operation is to be widely recommended as a prophylactic measure so as to prevent impregnations in patients who, during an occasional visit home, will be exposed to masculine company, the same results could be attained through liberalizing our abortion laws to permit dilatation and curettage operations in cases where the question of impregnation does arise. The fear of an operation would act as a check against promiscuity, while sterilization would, in many instances, re-encourage sexual liberty after the fear of conception has been removed.

ILLUSTRATIVE CASE REPORTS

Many feeble-minded patients are yearly discharged from mental hospitals back into the community. Rehospitalization is often a necessity in some because of failure to adjust themselves satisfactorily outside. Some contract marriage and give birth to children during their absence from the institution, the children in their turn frequently requiring institutional care. Sterilization of such individuals, especially those who are dependent upon the state for their maintenance within and outside the institution, should be considered as a beneficial measure both for the patients and society.

The following case history illustrates this group of patients. Mother and daughter, both mentally deficient, are at this hospital at present. The daughter was born shortly before the mother was sterilized and has since undergone the operation herself.

Case No. 11867. Female—aged 45 (at present). Diagnosis—mental deficiency without psychosis. F. H.—Father intemperate: 1 brother mentally defective. The patient had given birth to 2 children at the time of the sterilization which took place at age of 26. Since then she has been discharged and re-admitted on four different occasions. If not for the sterilization performed 19 years previously, this patient would probably have given birth by now to a large family. This patient's daughter, who is also mentally deficient and psychotic, has also been sterilized recently. A history of promiscuity was also obtained in her case before admission to the hospital.

Before fever therapy was instituted in neurosyphilis, patients suffering from general paresis rarely left the hospital in a much improved condition. Since then, however, with the advance of our modern methods of treatment, 20 to 40 per cent of our treated cases of paresis are able to leave the hospital and return to their families with the course of the disease partially or completely arrested. Out of this group, even following active treatment, many patients never return to their former intelligence level, nor are they able to reach their former earning capacity. Advice as to the use of contraceptives, where the conception is to be avoided for eugenic and social reasons, is frequently useless because of the patient's or the spouse's low intelligence. Oftentimes one encounters a history of several living children plus several miscarriages in the family. Sterilization in such instances would be fully indicated and should be carried out more often. Such a situation is illustrated in the following case history:

Case No. 17581. Female—aged 35—married. Diagnosis—general paresis. F. H.—Negative. The patient is of low mentality and her husband is of the same mental level. She has given birth to 4 living children and 1 stillbirth and has had 6 miscarriages. The living children are being cared for in an orphanage. A history of sexual promis-

cuity became prominent with the onset of the mental symptoms. The patient has received malaria and intravenous therapy with definite improvement in her condition. She returns to the hospital for a several months' stay once every two or three years for check-up and further treatment. She has been sterilized with her husband's approval, thus eliminating the danger of further pregnancies.

Although in many cases of schizophrenia no direct line hereditary transmissions of the disorder are encountered, sterilization is, in many instances, fully indicated, not primarily for eugenic reasons. The patient, who has recovered from an attack of schizophrenia, frequently shows some mental scars which indicate that an additional physical and mental load, especially of such burdensome quality as pregnancy and childbirth, would only tend to upset again this patient's equilibrium. In some instances contraceptive advice alone will suffice. Sterilization, however, in situations where neither spouse is dependable is a more satisfactory solution. To allow the patient to continue to bring children forth when she has neither the physical ability nor the mental balance to care for them would be sheer negligence on the physician's part. On almost every occasion, full approval was obtained from the family when the problem of sterilization was presented to them. In instances where the psychosis came on postpartum, the request that the operation be performed frequently came from the husband.

The following cases illustrate such situations:

CASE No. 19181. Female—aged 30—married, 3 children, youngest—6 months—third admission. Diagnosis—dementia praecox, catatonic. F. H.—One aunt psychotic; husband of low-grade mentality. Patient's attacks usually followed the birth of each child. She has made an overt attempt at suicide once. She was sterilized following the second admission. Somehow this case was overlooked during the first admission and no suggestions in regard to sterilization were made then. Since the operation was performed, she has been adjusting herself satisfactorily outside the institution.

CASE No. 19261. Female—aged 37—married, 4 children. Diagnosis—dementia praecox, catatonic. F. H.—Paternal grandfather heavily alcoholic; father occasionally alcoholic; maternal grandmother psychotic; two maternal great-aunts had "nervous breakdowns". The present is the third attack, although the first requiring hospitalization, and came on several months following the birth of the last child. The patient and her husband approved of the operation and the patient has remained home for over two years making a satisfactory adjustment.

In cases of psychopathic personality where sexual assaults and perversions figure prominently and where institutionalization is needed to prevent the patients from getting into further difficulties, sterilization will often help materially in dealing with them while in the institution. Their parole privileges can be increased then, without getting them into more difficulties. The following case histories deal with such problems:

CASE No. 16151. Female—aged 30—single. Diagnosis—Psychopathic personality, nymphomania, with mild manic-depressive episodes. F. H.—Father alcoholic; 1 brother epileptic; 1 younger sister suffered from precocious sexuality and also epilepsy and was a patient at this hospital until her death. On a number of occasions she was arrested for sexual misdemeanors. Salpingectomy was performed with the patient's consent. She still, however, remains a problem because of her runaway habits, but the danger of impregnation has been removed by sterilization.

CASE No. 17364. Male—aged 21—single. Diagnosis—Psychopathic personality without psychosis. The patient has been exposing himself in public places and has made several sexual assaults on women during his escapes from the hospital. Vasectomy performed on October 11, 1930, resulted in no change in the patient's behavior. Following bilateral orchidectomy, which was performed May 18, 1934, at the patient's request, he has reported great diminution in his erotic drive and also some gain in weight. He has not made any assaults on women since the operation, but he still remains a problem because of his incorrigibility.

CASE No. 17407. Male—aged 24—single. Diagnosis—Psychopathic personality without psychosis. F. H.—Father alcoholic; mother mentally deficient. The patient was a "blue baby" at birth and there was a questionable history of a head injury during adolescence. At the age of 17, the patient was charged with assault and rape on a young girl. He also tried to attack his mother and sister on several occasions. He stated that the sight of women would arouse uncontrollable sexual desire within him. At his own request a bilateral orchidectomy was performed in November, 1933. His sexual drive has disappeared since the operation, and for the present he presents only a problem of custodial care. His low mentality prevents his adjustment outside the institution.

With the increase of our knowledge as to the etiology of convulsive seizures, the previous assumption that epilepsy was an inherited disorder is rapidly giving way to the modern conception that what is described as epilepsy is really a multitude of pathologic conditions having in common the factor of convulsive seizures. Not every case of convulsive seizure is to be recommended for sterilization, even if the patient does require institutional care; in addition, a great many epileptics are able to maintain normal mental and physical health for the rest of their lives in spite of their handicap. But there remains a smaller group where the hereditary factors appear too important to be overlooked. In such instances mental deterioration appears early, accompanied perhaps by periods of confusion and excitement. Sterilization would be fully indicated here, for a deteriorated epileptic is a poor mother at best, and both the patient and society would benefit from this procedure.

CASE No. 19023. Female—aged 23—single. F. H.—One brother and 2 sisters suffer from epileptic seizures. The patient has had convulsive attacks of moderate severity since the age of 13. They are frequently followed by confused periods. She has an I. Q. of 70 on the 14 year level and of 61 on the

16 year level. She gave birth to an illegitimate child three years ago; of late she has been rather promiscuous sexually. She was discharged from the hospital following sterilization and is able to adjust herself temporarily under luminal therapy.

A number of psychiatric syndromes, having as a common denominator recurrent attacks of overactivity or depression, are at present classified under the heading of manic-depressive psychosis. Among them are included atypical anxiety states, panic reactions, situational depressions, catatonic episodes and classical cases of manic-depressive psychoses. The incidence of hereditary influence will depend on the diagnostician's conception of the psychosis. In the classical cases the hereditary incidence of the disease is high, reaching 70 to 90 per cent. If the concept is broadened out, the factor of heredity will appear of lesser importance. In institutional cases the diagnosis of manic-depressive psychosis is in itself not an indication for sterilization, for it is often found that where the precipitating causes are environmental, improvement in the environment will often eliminate recurrences. Sterilization should only be carried out in selected cases both for eugenic and therapeutic reasons. The first case illustrates the eugenic indication, while the second case was sterilized more for therapeutic reasons.

CASE No. 17775. Female—aged 41—married, 4 children, youngest 2 years old. Diagnosis—Manic-depressive, depressed. F. H.—Maternal uncle, maternal grandfather and 2 brothers committed suicide; 1 brother a patient in this hospital with the diagnosis of manic-depressive, depressed. The patient has had two previous attacks of depression requiring hospitalization in 1921 and 1925, respectively. Following birth of the last child she became irritable, depressed and suicidal. The patient was admitted May 31, 1931, was sterilized November 21, 1931, and discharged December 22, 1931. She has been adjusting herself satisfactorily since.

CASE No. 18646. Female—aged 34—widow, 5 children. First admission in 1923. Second admission in 1933. The patient had the first attack following death of her first husband. She made an uneventful recovery and was discharged as recovered. She remarried, gave birth to 2 more children and, following the death of her second husband, broke down again. Her children are at present cared for in an orphanage. She was sterilized January 28, 1934, and discharged August 10, 1934, as recovered. She still remains unmarried, but is well adjusted.

The history of the next patient brings up in retrospect the point as to whether sterilization was fully indicated in her case.

CASE No. 17418. Female—aged 25—single. Teacher by occupation. F. H.—Negative. Patient has had several manic-depressive episodes; she has always suffered from a strong sexual drive during her attacks, but has never been promiscuous sexually. Precipitating factors were the death of her mother, her father's remarriage and an unhappy home environment. Operation was performed April 2, 1932. She has married since and has had no recurrences of her mental illness. She is very desirous of having children of her own and her husband is financially able to support a family. She would like to have the patency of the tubes re-established, and the question is brought up, in view of her excellent adjustment since leaving the hospital and absence of positive family history, whether the operation was fully justified.

DISCUSSION

In order to determine approximately the percentage of patients admitted yearly to the state hospital in whom sexual sterilization was indicated, all the case histories of one year's admissions were briefly reviewed. In 4 to 5 per cent of the admissions the operation was found to have been fully indicated either for eugenic or therapeutic reasons. In another 4 to 5 per cent it was felt the operation should have been considered, but there did not appear to be any immediate need for its execution. This group comprised cases where marriage, even after recovery took place, was completely out of the question and where sexual promiscuity did not enter into the picture. Operations in several such cases, it was felt, would only have acted as an additional emotional trauma on the patient. In another 10 per cent the operation was only considered, but, because of complete absence of any sexual history or because of the patients' deteriorated mental condition, no definite reasons could be found for subjecting the patients to unnecessary surgery.*

Before a patient in a mental hospital is subjected to sexual sterilization, unless one is blinded beforehand by certain dogmatic statements as to the value of such procedure, one must question what benefits are going to accrue to society or to the patient as a result of this operation. At present the organic psychoses supply about 50 to 60 per cent of our admissions to the state hospitals of this country. In the organic group, heredity plays little rôle in the causation of the mental disorder. If such a patient is sterilized, it must be for therapeutic reasons only. In the remaining 40 per cent, of which dementia praecox supplies about 18 per cent of admissions and manic-depressive psychosis about 12 per cent, heredity is often blamed for their occurrence, but how it acts still remains unknown. In our own cases of dementia praecox the children were born before the patient's admission to the hospital, and the sex habits of the majority of dementia praecox patients are such as to preclude any promiscuity or even a moderate degree of fecundity

*According to the Bureau of Census report, 94,689 first admissions entered the mental hospitals of the United States in 1932. If the above percentages were applied, the operation would be fully indicated for one reason or another in about 4,000 patients. In an equal number the operation would need to be considered, but with many reservations as to its usefulness. In Germany, where compulsory sterilization is applied to the population at large for eugenic reasons only, it is expected that about 4 per cent of the population will be sterilized after the law becomes fully enforced, although during the first year only about 56,000 sterilizations, or about 1 in 1,000 of the general population, have been performed, at a cost of ten million dollars.

after the onset of the disease. As to the inheritance of dementia praecox, an increased incidence is found in the collaterals, but direct transmissions of the disease are not frequent, and in only one instance in our sterilized cases were both mother and daughter affected. In manic-depressive psychosis the hereditary incidence is much higher; but, again, not every manic-depressive is a potential parent of manic-depressive offspring, for the disease is more often found in uncles, aunts and cousins rather than in the direct forbears of the patient.

Henderson and Gillespie[4] have well expressed the gist of our present knowledge of the inheritance of mental disease. They state, "Too much stress has been laid on the rôle of heredity in mental disorders, although it must be very great. The unvarnished truth is that very little even of what is probable is known of inheritance of mental instability and almost nothing is firmly established. The reasons for this are various. The primary difficulty which all investigators of human heredity have to encounter is the paucity of satisfactory data and the obstacles to their collection. Human families, with their long intervals between generations and the small number of their members, do not lend themselves to study in heredity. Moreover, it is often necessary to collect data about ancestors on a hearsay basis only. Such terms as 'nervousness', 'irritability', and so on, especially as given by lay persons, can have little value. Yet in spite of the necessary lack of exactitude in mere impressions of this sort, clinical experience forces the conclusion that heredity is of considerable importance. But clinical impressionism is hardly sufficient, and more exact observation is an obvious desideratum." They conclude that "the quantitative difference between the inherited total taint in the psychotic and the mentally normal is surprisingly low. There is, however, a considerably greater direct inheritance of actual mental disorder in the psychotic, while in the normal the indirect inheritance of all types (psychoses, organic nervous conditions, and so forth) is greater than in the psychotic. The hereditary tainting, especially with psychoses, is greater in manic-depressive disorders than in any others. Certain families show an abnormally high incidence of mental disease. Mother-daughter transmission is more common than any other. Disorders of manic-depressive type especially have a familiar incidence. Clinically dissimilar types do occur in the same family. The inheritance of dementia praecox is more commonly dissimilar. An apparently dissimilar type may possibly be produced by the mingling of ancestral types. Mendelian studies are inconclusive. There is some evidence that manic-depressive insanity follows a dominant and dementia praecox a recessive course. Feeble-mindedness is said by some to be inherited on Mendelian lines. Alcoholism and nervous disorders are more frequent in ancestors of congenital defectives than in the antecedents of any other types of mental disease."

Much as one would like to rely on the patient's diagnosis alone as a criterion for sterilization, one must confess that psychiatric diagnosis and prognosis are still quite fallible. The diagnosis itself may vary from institution to institution in the same state, as shown by Bancroft[5] in 1914 that the ratio of manic-depressive psychosis to dementia praecox varied from .28:1 to 1.11:1, respectively, between Taunton State Hospital statistics and those of the Boston State Hospital. In the New Hampshire State Hospital the ratio of manic-depressive psychosis to dementia praecox has dropped from 1.25:1 to .42:1 in the twenty years since Dr. Bancroft's survey. If diagnostic criteria can vary to such a degree, one wonders to what extent they are going to affect the psychiatrist's attitude toward sterilization. Would some neurotic anxiety states, mild hypomanic episodes, acute panics or alcoholic excitements be included under the diagnosis of manic-depressive psychosis and therefore be sterilizable or would they be considered as cases not suitable for sterilization, because they really are not cases of manic-depressive psychosis? Again, in cases of mental deficiency, even where the family history gives no definite indication of the hereditary transmission of the defect, many cases would need to be sterilized if mental deficiency in itself is considered as a sufficient reason for sterilization and provided only the low mental level of the patient is considered. It must not be forgotten, however, that many cases of mental deficiency are not on a hereditary basis. Birth injuries, underweight at birth, head injuries and infections in childhood, all may be causative factors. Sterilization of such an individual may cause the termination of sound germplasm, which in itself is not always affected by the fact that it is transmitted by an individual who through injury to his or her cortex at birth or through infection is below par mentally. This is well illustrated in a recent case in California, where the patient was sterilized at the request of her foster mother because of her low I. Q., although no family history of mental deficiency was apparent at the time the sterilization was recommended. Similar situations may occur in association with traumatic epilepsy, in manic-depressive and schizophrenic states coming on following severe infections, in head injuries or in association with brain tumors.

Is compulsory sterilization going to solve the problem of mental disease? It would if all the carriers, both latent and active, could be recognized, isolated and sterilized, but this of

course would involve sterilizing a large part of the general population outside the hospital. Even in mental deficiency, where the percentage of direct transmission is greater than in any other form of mental disorder, Tredgold[6] states that sterilization of all the feeble-minded in all the institutions would have little or no effect on the increase of mental deficiency in the future, a viewpoint which is concurred in by others. In regard to the number of latent carriers of mental disease, the incidence in the psychotic is not much greater than in the so-called normal. In Diem's[7] studies, tainting occurred in 77 per cent of psychotic cases and in 67 per cent of the normals. Koller[8] found the ratio of tainting between the normal and the abnormal to be 59:76. In a study of descendants of 1000 schizophrenics carried out by Canavan and Clark[9] at the Boston Psychopathic Hospital, out of 381 children, 295 were considered normal, 4 were feeble-minded, 5 suffered from dementia praecox, 12 were backward and the rest suffered from physical and mental disorders for which the parents' illness may in itself have been a contributing factor. In a later study by the same authors,[10] it was disclosed that only 8 out of 370 children, or 2 per cent, became committedly insane. The incidence of schizophrenia in this group is much smaller than in the group studied by Bleuler[11] at Bloomingdale, who found an expectation of illness of schizophrenia among siblings of schizophrenics of 4.8 per cent. The difficulty in accurately detecting active carriers even among mental patients is pointed out by the British Departmental Committee on Sterilization. The members felt "that the legislature would not feel justified in forcing any person to submit to sterilization unless it could be shown beyond reasonable doubt that at least some of the offspring either would be mentally defective or would have a mental disorder, and of this no proof can be produced." They concluded in favor of voluntary sterilization, especially in cases of physical disability that are hereditarily transmitted and in cases of mental disorder where the patient is willing to submit to the operation.

In spite of paucity of accurate knowledge as to the mechanism of transmissions of mental disease and the general lack of agreement as to what is transmitted from parent to offspring, compulsory sterilization can serve as an important therapeutic adjunct in the treatment of patients. Furthermore, it is also useful from the eugenic standpoint. No matter how much one may disregard hereditary factors and blame mental disease on the environment, every institutional psychiatrist has come across individual families that have contributed an exceptionally large number of members as patients to mental institutions. Such families Mott[12] designates as "bad stock" with the following description: "A bad stock is one where one found a large number of members exhibiting various forms of degeneracy including insanity, e.g., feeble-mindedness, epilepsy, criminality, pauperism, inebriety: in fact a general low standard, mental and physical, in stem and branches of the family tree; the further growth of which should be cut off." In wild life it matters little whether a female gives birth to one or one dozen young; those whom she is unable to feed and protect will become eliminated in the course of time. In human society, however, those who are unable to care for themselves are cared for by the state, and, in such instances, the group that is going to bring up and support the future offspring of the defective individual should have some say in regard to their multiplication. Such cases, which are really in the minority, attract much attention to the problem of heredity and stimulate much speculation among the uninformed. To a great many, heredity is still an unalterable, magic fluid which is transferred in an unbeknown manner from parent to offspring. It remains forgotten that heredity means much more, that the explanation of heredity is not so simple and that typical psychoses are not transmitted from parent to offspring. What is inherited is a mode or reaction to stimuli emanating from without or within, which may express itself grossly only occasionally in a similar psychosis in parent and offspring. This similarity of expression depends on likeness of bodily structure in parent and offspring, an analogy in the layout of their vascular systems, endocrines interrelated similarly in both, and a configuration of nerve cells in both which makes them react much alike to the same stimuli. This physical structure, however, may become modified in the offspring for better or worse through factors introduced by the other parent, through changes in the maternal diet during the individual's intrauterine existence and through prenatal and birth injuries, infections and injuries in infancy and childhood. Heredity thus becomes both a stable and a modifiable entity. Good stock can deteriorate and bad stock can be improved through intermarriage with good stock, although in the human community such experiments cannot be carried out successfully. Attempts at improving bad stock through intermarriage with better stock are usually futile, because it is only on very rare occasions that such Cinderella-like marriages take place. A man or a woman coming of poor stock usually marries for lack of better choice, someone coming also from undesirable stock, thus often accentuating and bringing to the fore all the undesirable qualities present in both stocks.

That improvement of the environment and better conditioning early in life is of much value in helping mental deficients to adjust almost on a par with normal individuals has been pointed by Meyer[13] and his associates at the Phipps Clinic in their study of the feeble-minded children in a small suburb in Baltimore, Maryland. They found that under supervision and training, even outside an institution, the majority of feeble-minded individuals above a certain level can be adjusted satisfactorily, provided someone takes sufficient interest in their problems and takes pains to guide them when guidance is needed. This study also disclosed that the intelligence of the offspring of the mentally deficient individuals was, in many instances, much higher than the intelligence of the parents.

Not many accurate studies have so far been carried out to determine the exact influence of environmental changes on the intelligence of the growing child. Freeman and his associates[14] in Chicago have found that early placement of foster children in advantageous surroundings has been of much value in raising the intelligence level of the mentally deficient child. The fact does remain, however, that, in many instances, the stock is either so very poor or the environment so hopeless that one feels it best be cut short through sterilization, for, like all living matter, it is better off dead than dying.

The main objection to compulsory sterilization is that it might become a dangerous weapon in the hands of the well meaning, but ill-informed, reformers, who would proceed to sterilize everybody who had any potentialities for the transmission of mental disease, irrespective of their other good qualities. This has been forcibly pointed out by Myerson[15] in his critique of proposed eugenic sterilization. Again, if it were decided to sterilize every inmate in every state institution within child-bearing age, our mental hospitals would tend to become training centers for embryo surgeons, a real danger when one considers the low standards existing in some state institutions. The mental hospital would then become a surgical laboratory and sterilization would become a main objective rather than of secondary importance in the prevention of mental disease. Furthermore, it is not always possible to depend on the heads of county institutions to maintain an impartial attitude and not become biased by religious, social and personal reasons. An impartial board, similar to that set up in the Province of Alberta, which would review every case after it was recommended by the county or state authorities, would place compulsory sterilization on more impartial footing and would eliminate any misapplication of the law for any reason whatsoever.

SUMMARY

1. The New Hampshire sterilization laws are briefly reviewed and their application discussed.

2. A total of 310 patients have been sterilized during a period extending from April 18, 1917 to January 1, 1936. Fifty-five patients were sterilized under the old, voluntary statute (1917-1929) and 255 patients since the compulsory sterilization law went into effect (1929-1936).

3. So far the law has not been challenged in the courts, and usually no objection is encountered from the patient's family if the purpose of the operation is made clear to them. Frequently the request for the operation has come from an interested member of the family.

4. Data are presented in regard to the diagnostic classification of the cases sterilized, the hereditary findings and the discharges following sterilization. The indications and contraindications for sterilization in selected cases are discussed.

5. A law permitting the performance of therapeutic abortion, whenever indicated, in patients in mental hospitals is suggested.

6. The establishment of a special board of review, similar to that of the Province of Alberta, Canada, which would pass final judgment on cases recommended by the county and state authorities for sterilization and which would act as a further safeguard against overdiligence in application of the law in cases where the indications are doubtful, is proposed.

CONCLUSIONS

The compulsory sterilization law, when applied judiciously to institutional patients, has been found useful for eugenic, therapeutic and prophylactic reasons.

It has permitted an increase in the parole privileges of many patients; has allowed an additional number of visits and discharges; and has also enabled certain patients to get married to whom marriage was previously forbidden because of the New Hampshire statute forbidding the marriage of insane and feeble-minded individuals.

The eugenic indications alone should not be considered as the only reason for suggesting the operation. All other factors should also be taken into account.

To Dr. Dolloff, the superintendent of the New Hampshire State Hospital, whose interest in the various aspects of human sterilization made this study possible, I wish to express my sincere appreciation for his many valuable suggestions and also for his permission to use the hospital data contained in this report.

REFERENCES

1. Report of the Departmental Committee on Sterilization. (London: His Majesty's Stationery Office.)
2. Baragar, C. A.; Davidson, G. A.; McAlister, W. J., and McCullough, D. L.: Sexual sterilization: 4 years' experience in Alberta. Am. J. Psychiat. **91**:897 (Jan.) 1935.
3. Sharp, Harry C.: Vasectomy as a means of preventing procreation in defectives. J. A. M. A. **53**:1897 (Dec. 4) 1909.

4. Henderson, D. K., and Gillespie, R. D.: A Text-Book of Psychiatry for Students and Practitioners. Humphrey Milford. London: Oxford University Press. P. 26, 1932.
5. Bancroft, Charles P.: Is there an increase among the dementing psychoses? Proceedings of the American Medico-Psychological Association. **21**:287 (May) 1914.
6. Tredgold: Cited by Myerson, *loc. cit.*
7. Diem, O.: Die psycho-neurotische erbliche Belastung der Geistesgesunden und der Geisteskranken. Arch. f. Rassen.- u. Gesellsch. Biol. **2**:215, 1905.
8. Koller, J.: Beitrag zur Erblichkeitsstatistik der Geisteskranken im Canton Zürich; Vergleichung derselben mit der erblichen Belastung gesunder Menschen durch Geistesstörungen u. dergl. Arch. f. Psychiat. **27**:268, 1895.
9. Canavan, M. M., and Clark, R.: Mental health of 463 children from dementia-praecox stock. Mental Hygiene **7**:137 (Jan.) 1923.
10. Canavan, M. M., and Clark, R.: Second report on the mental health of children of dementia praecox stock. Bull. Massachusetts Dept. Ment. Dis. **19**:17 (April) 1935.
11. Bleuler, M.: Contribution to problem of heredity among schizophrenics. J. Nerv. & Ment. Dis. **74**:393 (Oct.) 1931.
12. Mott: Cited by Henderson and Gillespie, *loc. cit.*
13. Fairbank, Ruth E.: The subnormal child—seventeen years after. Mental Hygiene **17**:177 (April) 1933.
14. Freeman, F. N.; Holzinger, K. J., and Mitchell, B. C.: Influence of the Environment on the Intelligence, School Achievement and Conduct of Foster Children. Twenty-Seventh Yearbook of the National Society for the Study of Education, Nature and Nurture. Chapter XI. Bloomington, Illinois: Public School Publishing Company.
15. Myerson, A.: Critique of proposed "ideal" sterilization legislation. Arch. Neurol. & Psychiat. **33**:453 (March) 1935.

MEDICAL PROGRESS

PROGRESS IN LARYNGOLOGY

BY LE ROY A. SCHALL, M.D.,* JOHN R. RICHARDSON, M.D.,* AND WERNER MUELLER, M.D.*

DURING the past year, the outstanding literary achievement of interest to otolaryngologists is Hansel's[1] monograph on allergy of the nose and paranasal sinuses. He has brought into one volume the best of the recent researches and presents both sides of controversial subjects. The method of presentation makes his book very valuable to both the rhinologist and the expert in allergia.

Many articles on allergy have appeared. Buhrmester[2] has been studying the chemical composition of nasal secretion. He finds that the total solids and protein content of suppurative sinus exudate is about three times that of allergic secretion. The water and ash content is greatest in allergic rhinitis while the greatest disturbance in the mineral content is found in the calcium and potassium values in suppurative sinusitis.

Cameron[3] believes that allergic nasal changes do not predispose to bacterial invasion, although he admits that his belief is difficult to prove. An intramucosal test is proposed by Dean[4] and his coworkers. They find that the nasal mucosa is more sensitive than the skin and that the reactions are not annoying.

Experience with ionization has been accumulating although insufficient time has elapsed to give it its true place as a form of treatment.

Alden[5] reports that 75 per cent of cases of perennial allergic rhinitis are relieved; Bernheimer[6] reports 69 per cent, while Garfin and Pearl[7] had 90 per cent demonstrating relief. Hurd[8] says that symptoms of hay fever disappear immediately after ionization in nearly all cases while Barrett[9] feels that this form of treatment is good in some cases, of moderate value in others and without benefit in the rest, and that it will take more investigation over several years before its true worth will be known.

McMahon[10] has continued his studies of the sinus mucosa of dogs after ionization. He finds that there is a marked fibrosis of the subepithelial structures with marked hyperplastic changes in the bone. The epithelial changes in the nose consist of a primary destruction and later regeneration practically to normal; while in the frontal sinuses there is a transition to a cuboidal type of cell over the areas of greatest destruction.

Our concept of allergic rhinitis and its treatment is well presented in a panel discussion headed by Dean et al.[11]

This discussion emphasized certain clinical phases of allergic rhinitis, particularly diagnosis, and it is worth quoting:

"About ten days of study are necessary. A meticulous history should precede the physical examination. Skin tests should be made. Intramucosal tests are necessary in order to determine the sensitivity of the mucous membrane of the nose. Passive transfer should be done if mucosal tests are positive. In addition to this there should be a careful study of the nose and nasal sinuses.

"Dietary irregularities should be sought for. If dietary deficiencies are found, the patient should be put on an optimum well-balanced diet. If because of food sensitivity essential foods are withheld, they should be replaced by others of equal value. Endocrine defects must not be overlooked. A careful bacteriologic examination is necessary.

"The treatment of allergic rhinitis consists in the avoidance of allergens and desensitization. In addition, the diet should be properly supervised, proper hygienic measures instituted and endocrine dyscrasias, if present, treated.

"It is difficult to understand how one could apply a nasal treatment in an individual that has a normal nasal mucosa preceding the at-

*Schall, LeRoy A. — Assistant Laryngologist at Robert B. Brigham, Palmer Memorial and Collis P. Huntington Memorial Hospitals. Richardson, Johr R.—Clinical Assistant, Massachusetts Eye and Ear Infirmary. Mueller, Werner—Clinical Assistant, Massachusetts Eye and Ear Infirmary. For records and addresses of authors see "This Week's Issue," page 563.

tack of acute allergic rhinitis. The moment, however, that we have a pathologic nose the problem becomes a different one.

"Adenoids, deflected septa, exostoses, chronic purulent sinusitis, if present, should be given attention. The most important nasal condition from the clinical standpoint is a chronic intumescent rhinitis.

"It is this condition which is so beneficially arrested by ionization. Ionization will shrink the moist, boggy mucosa of the nose and leave a membrane which is thinner and dryer.

"It is unlikely that ionization has any effect on the allergic reaction of the tissues themselves. Because of the changes in the tissues, some of the disturbing features of allergic rhinitis are lost. The ability of the nasal mucosa to absorb inhaled pollens seems to be disturbed. The normal nasal mucous membrane does absorb pollens; the treated membrane is more like the skin and resists the entrance of the pollens into the tissues.

"In chronic intumescent rhinitis one can often secure just as good a clinical result as that of ionization by using procedures that do not cause the deleterious results that we get with ionization. The chronic intumescent membrane may be made quite normal by the avoidance of offending allergens, by desensitization, by the removal of adenoids or by a proper diet combined with the use of a vaccine.

"The treatment of acute allergic rhinitis is, first, the avoidance of allergens and desensitization. If a co-existent chronic intumescent rhinitis cannot be controlled by simpler procedures we should be certain that the beneficial effects of ionization will outweigh its deleterious action."

COMMON COLD

Sewall[12] believes that chronic sinusitis is the chief source of the common cold. He bases his belief on the observation of the pathologists who have demonstrated bacteria in the stroma of the sinus mucosa. With the lowering of the patient's resistance, Sewall believes that these bacteria become pathogenic. This would be an excellent explanation of the cause of the common cold, if the finding of bacteria in the mucosa could be substantiated by the majority of laboratory workers. Blackmar[13] has been following the work of Jarvis on the biochemical reactions of the body as indicated by the color of the nasal septum.

Kracaw,[14] Ruskin[15] and Womack[16] report beneficial results from the use of bacterial antigens in the treatment of the common cold.

Ruskin[17] also thinks that there is a severe loss of nucleoprotein through nasal discharges either suppurative or allergic. This loss manifests itself as a deficiency in some cases which appears as a disturbance of water metabolism allied to nephrosis. Nasal allergy is related to nucleic acid. The author reports five cases that showed such favorable response. Nucleic acid influences the water exchange of mucous membrane and may represent a cause of allergic manifestations.

Russell,[18] in a review of the literature, finds that papillomas of the nasal cavities are rare. He reports two cases. Brandenburg[19] also reports one case, while Kramer and Som[20] present five cases of papilloma of the nasal cavity.

An analysis of the cases of papilloma of the nasal cavity heretofore reported in the literature showed that in addition to the true papillomas, there are included numerous instances of inflammatory polypi, innocent cutaneous warts and papillary carcinomas. True papillomas are nonmalignant neoplasma of epithelial origin. The intense proliferation of the epithelium represents the dominant factor in the production of the tumor, the stroma growth is subordinate. True papillomas are most often encountered in the ethmoid labyrinth; the antrum is the next favorite site.

The tumors exhibit a marked tendency to local recurrences even after apparently complete removal. Total extirpation is difficult because of the diffuse involvement of the nasal mucosa papillomatosis. Recurrences are attributed to small overlooked remnants of the original tumor. A further characteristic is that these tumors tend toward a malignant transformation.

The treatment of choice for papillomas of the nasal cavity is total extirpation followed by radiotherapy.

Chamberlin[21] briefly reviews the essential facts about rhinoscleroma. His conclusions are that it is no longer confined to a fairly definite locality in southeastern Europe but is fairly well distributed over the entire world. While the bacillus of Frisch can be easily obtained in all cases in almost pure culture, the diagnosis is made by the presence of the vacuolated lace or foam cells of Mikulicz and the hyaline bodies of Unna. The mode of transmission is still unknown and hence no definite means of combating the disease are known. At the present time roentgen radiation or radium offers the best hope of control or cure.

PHYSIOLOGY

O'Malley[22] brings out that failure of the regular sequence of alternating pressures marks the first step in the onset of sinus disease. If not restored the positive phase is the first to go and, if this is the result of an infective process, sinusitis ensues. This is contrary to the popular view which ascribes the onset to ciliary paralysis produced by toxins.

The intranasal factors that influence ventilation are anatomic design, irregularities of growth, acquired irregularities and disease.

Thomson[23] recalls experimental work done by

himself and Prof. R. T. Hewlett, forty years ago, on the micro-organisms in the healthy nose. They showed that in 80 per cent of their cases, the nasal mucus was sterile. This work has stood the test of time. Thomson then enumerates in detail the various modes of defense, in normal conditions of health, of the air passages against bacterial invaders. The mucus and the cilia form the first and most important line of defense and are mutually interdependent for the efficiency of their functioning. He gives a detailed account of the action of the cilia in the various parts of the nasal cavities and of the methods employed in their study, as well as their relationship to clinical and pathologic manifestations. The chief purpose of the author is to show the complexity and perfection of these local defenses; to appreciate their arrangement, their modes of action, and their compensatory interactions; and to encourage interest in normal processes as a necessary first step to the study of disease. Viktorow[24] observed ciliary activity by placing tiny charcoal particles on isolated frog esophagi.

Ciliary motion was inhibited by alkaline salts such as sodium bicarbonate and sodium biborate, also by menthol and glycerine. Cocaine 2-3 per cent narcotized the epithelium after a preliminary acceleration and cocaine 1 per cent narcotized without previous acceleration and phenol 0.2 per cent, accelerated ciliary motion.

Renvall[25] studied the behavior of ciliated epithelium of adenoid tissue at various temperatures and after subjecting the specimens to various chemicals, notably to drugs usually employed in the treatment of the nose. Some of the drugs were dissolved in distilled water and Ringer's solution respectively. Most drugs caused retardation and arrest of ciliary motion with the single exception of ephedrine which had a decided acceleratory effect. Final lavage of the specimens with Ringer's solution had various results. In some cases motion was reestablished to varying degrees; in others the arrest was permanent. Thus there was permanent loss of motion after: distilled water, cocaine 20 per cent, percaine 3 per cent, pantocaine 2 per cent (both in distilled water and in Ringer's), Lugol's solution 1 per cent, silver nitrate solution 0.01-2 per cent, and ammonia 0.5-3 per cent. Partial recovery occurred after the use of adrenaline 1 per cent, glycerine, phenol 0.1-1 per cent, ammonia 0.1-0.2 per cent, and chloretone inhalant. The recovery was perfect after alcohol 5-20 per cent. Alcohol 5 per cent in Ringer's solution merely slowed the action. Fetissow[26] refers to the experimental work done on animals and cautions against the indiscriminate acceptance of the conclusions in regard to man. In his opinion man is far more adaptable in this respect than dogs and rabbits. As a proof of his contention he cites three luetic cases of complete nasal obstruction of three, five and six years' duration respectively. Biopsy specimens were taken from the inferior turbinates. All showed a completely normal mucous membrane.

Tchudnosovetof[27] made further experiments in order to determine the true nature and significance of the type of breathing (i.e., nasal or tracheal) on the subarachnoidal injection of India ink. Thirty-seven dogs were used. In ten of these nasal breathing was used, in twelve tracheotomy was done, and the nose and mouth excluded as respiratory pathways; in the remaining fifteen mixed breathing was used.

After the death of the animals the macroscopic and microscopic appearance of the nasal mucosa and the condition of the cervical lymph nodes were observed. It was found that in tracheal breathing a stagnation of the tissue fluids developed in the nasal cavity, which endangers the well-being of the organism by giving rise to conditions favorable for the penetration of all kinds of infectious agents.

TONSILS

Zoltán[28] investigated the relationship between chronic tonsillitis and thyroid disorders. Laboratory tests done before and after tonsillectomy showed no relationship of a hormonal nature. One could rather think of an infectious metastatic relation. A few carefully observed cases of goitre cured by tonsillectomy support this assumption.

Key-Aberg[29] described "deep" peritonsillar abscess and contrasts it with the usual "high" variety. The symptomatology of the "deep" abscess differs from that of the "high" as follows: Trismus is moderate or insignificant, redness and swelling of the faucial region are much less, absence of tenderness and fluctuation, marked adenopathy at the angle of the lower jaw, especially in children and young people, often resulting in a torticollis attitude. In addition to these symptoms the patient complains of pain, sore throat, and at times dyspnea.

If there is a suspicion of a deep abscess an exploratory puncture is made. If this is negative, the case is considered one of "deep" abscess. His treatment is enucleation of the diseased tonsil. The author has treated 170 cases of peritonsillar abscess, twelve of which were of the "deep" variety.

Rubin[30] reports a case of an unusually large calculus of the tonsil, the tonsil with the stone weighing 24 2/3 grams.

Meurman[31] recommends his simplified modification of Gowen's nerve block anesthesia for tonsillectomy. Inasmuch as the injection needle does not come in contact with the tonsil itself, this procedure is especially indicated in doing tonsillectomy during the course of acute throat conditions such as septic sore throat and peritonsillar abscess.

In ten out of several hundred cases done with this method the author noted the appearance of Horner's syndrome which, however, cleared up after about an hour, the patient not being aware of it at any time. This complication, harmless as it has proved to be, can be avoided by not pushing the injection needle beyond the plane of the posterior pillar.

Alföldy[32] believes that in such skin diseases as acute and chronic dyshydrosis and eczema severe nasal and pharyngeal pathology (tonsillitis, sinusitis, and so forth) are often found. Indications for tonsillectomy and sinus surgery should be based on the objective findings regardless of subjective histories.

As an aid to diagnosis of allergy, Kallos[33] examined smears taken from the nose, sinuses, and tonsils of 120 patients for eosinophiles. Where possible, the results were checked by means of histologic examination of tissues. A count of 6 per cent was regarded as normal. In chronic rhinitis and sinusitis the secretions contained 10-50 per cent eosinophiles. The same percentages were found in the nasal secretions of cases with polyposis. In acute suppurative sinusitis the secretions contained less than 6 per cent. The tonsil secretions of patients with articular and muscular rheumatism likewise showed a marked increase and even preponderance of eosinophiles. Tonsil secretions of patients without arthritic or allergic disease showed no such increase. Frequently only one tonsil was positive.

NASAL SINUSES

It is now realized by most internists and otolaryngologists that there is a close interrelationship between various types of sinus infection and certain diseases of the lower respiratory tract, but is it highly necessary that the general practitioner should have a clear understanding of the importance of a prompt and thorough investigation of the sinuses in an effort to explain the cause of most of the chronic nontuberculous chest diseases? Much valuable time could be saved to the patient if a competent otolaryngologist were consulted early in such cases. The chest conditions that can be traced most directly to sinus disease are peribronchitis, tracheobronchitis, bronchitis, bronchiectasis, and many cases of bronchial asthma. McLaurin[34] discusses these in detail and concludes that the indications for sinus surgery in asthmatics are as follows:

1. Sinus disease that would demand surgery, regardless of the existence of asthma.
2. Cases where the removal of polyps or simple methods of drainage and ventilation have helped the asthmatic state, but where such measures will not completely eradicate the sinus disease.
3. Cases in which recurrent attacks of rhinitis with exacerbations of the sinus disease seem to precipitate attacks of asthma.
4. Cases in which the patient has been proved sensitive to his own infection, but the local sinus pathology would not ordinarily require surgery.

Hodge[35] agrees that the association of nontuberculous bronchiectasis and infection of the paranasal sinuses is extremely common. Pulmonary collapse and pneumonitis, frequently noted in early childhood, so weaken the structure of the lungs that there is a suitable soil for subsequent infection. Bronchiectasis, as evidenced by the number of dry cavities reported in the lungs of both children and adults, is more frequent than was previously supposed. Infection of the sinuses associated with bronchiectasis may date from early childhood or may occur as a secondary infection in later life. The treatment of bronchiectasis is surgical. Any focus of infection should be, when possible, removed from the upper respiratory tract before surgical intervention on the lungs is attempted. Best results will be obtained from medical treatment if it is commenced in early childhood.

Fenton and Larsell[36] have continued their experimental study of artificially produced sinusitis. They are convinced that any preparation applied to the surface of the nasal membrane is an irritant unless its strength is isotonic.

Linton[37] has also performed experimental studies by the injection of a vaccine virus-bacteria-testicular extract combination into the maxillary sinus of the rabbit.

Lierle and Moore[38] in their experimental work have made use of a transparent window in the lateral walls of the maxillary sinus of living rabbits. The investigators find that, although drugs depressed or stopped the activity of the cilia, only those which were actual cautery agents produced any permanent injury.

Boling[39] repeats the experiments of McGregor and Knowlton by studying the regeneration of the maxillary sinus mucosa of the lamb. He found complete regeneration, including the glands, within two months' time.

Articles on sinus surgery have been written by Mithoefer,[40] Sewall,[41] Luongo,[42] Chase,[43] McNaught,[44] Good,[45] and others.

Skillern[46] calls our attention to obliterative frontal sinusitis. This disease is an osteogenic thickening resulting from a pathologic stimulus and is classified as a benign bony tumefaction. Osteogenesis is nature's protective mechanism to infection and depends on the ability of the compact bone to respond to a bacterial or traumatic stimulus. The usual finding is that of unilateral osteogenic thickening affecting chiefly the anterior plate of the frontal sinus. The roentgenogram diagnosis may be

"failure of development" or "absence of" the affected sinus. Even if negative, no x-ray diagnosis of sinus disease should be accepted unless confirmed by the rhinologist. And when the roentgenogram shows a large unilateral frontal cell ending abruptly at the midline of the forehead, its fellow should be suspected of osteanagenesis. Failure to make this diagnosis results in multiple intranasal operations which do not give relief of symptoms.

Kramer[47] reports a case of primary actinomycosis of the sphenoid proved by autopsy.

Gundrum and Semenov[48] report 64 per cent improvement in a series of 135 cases of sinusitis treated by the displacement method as advocated by Proetz.

Warren[49] believes that deep x-ray therapy is a valuable adjunct in the treatment of chronic sinusitis.

Osteoma of the nasal accessory sinusitis has been the subject of papers by Hoover and Horrax,[50] Bryant,[51] Carmody,[52] Gatewood and Settel.[53] Hoover and Horrax advocate transcranial approach to the orbit.

The blood vessels of the lateral nasal wall and their relation to the turbinates and sinuses have been studied by Burnham.[54] This investigation has brought to light a number of anatomic points of interest which have not previously been recorded, and many of them have an important clinical bearing.

Comparatively large canals are present in the central part of the middle and posterior half of the inferior turbinate bones. They contain, (1) terminal branches of the turbinate arteries; (2) veins ("jacket plexus"), which form an essential part of the "venous pathways"; (3) nerves.

Three definite canals are present in the posterior half of the inferior turbinate. The uppermost of these canals contains vessels for the antrum and its connection with the latter through the "uncinate aperture" is described. The "aperture" is a very important and constant naso-antral bony opening, inferior to the uncinate process, through which the antrum obtains a large part of its blood supply.

The term "venous pathways" has been used to indicate the large channels of veins which carry the blood over the lateral nasal wall to the sphenopalatine foramen. They are three in number: (1) inferior turbinate, (2) middle turbinate, and (3) superior turbinate venous pathways. Each pathway is made up of erectile vessels which pass into either periosteal or "intraosseous" veins and each of these joins the "jacket plexus" of veins within the bony canals of the turbinate. They then leave the canals, passing into periosteal veins again before reaching the sphenopalatine foramen.

The "intraosseous" veins are mainly present in minute bone canals in the anterior half of middle and inferior turbinates and have not previously received consideration in the literature.

The superficial veins of the lateral nasal wall present such sharp turns and twists in their courses that they may be described as convoluted.

This subject has also been investigated by Swindle,[55] who believes that the arterial network in the mucous lining of a nasal passage of a postnatal mammal consists of two interconnected and intricately interlaced networks. One of these consists of numerous, thin-walled, very inflatable, vein-like arteries which do not give rise to arteriocapillary anastomoses. The other network consists of numerous slender vessels which are more like typical arteries of the same size elsewhere in the body. The typical arteries give rise to numerous arteriocapillary anastomoses. Some of the connections between the two networks resemble true arteriovenous anastomoses (AVAS) and were accordingly called pseudo-arteriovenous anastomoses.

BRUCELLOSIS

Cases of brucellosis are now reported from every state in the Union, Canada, the British Isles, Scandinavia, Germany, France and Austria. Etiologically it follows the drinking of milk contaminated by Brucella or contact with infected cattle, or domestic animals. Its incidence in infancy, childhood and adult life is apparently increasing owing to the extensive and thorough search for the organism.

Cody[56] reports four cases and describes the method of diagnosis. He states that the otolaryngologist comes in contact with the complications of brucellosis as well as with the systemic infection. Nerve deafness may occur, as in other infections. The complication of mucosal lesions of the pharynx and larynx may resemble those of tuberculosis and syphilis. The systemic infection occasionally simulates some aspect of pyogenic infection of the ear, nose and throat. Only rarely will the need even of considering brucellosis arise except in patients with fever of uncertain origin and in typical cases.

LEUKEMIA

Love[57] has reviewed 152 cases of leukemia. He has personally observed forty-one cases. The purpose of his paper is to indicate the frequency of leukemia manifestations in otolaryngologic practice, to describe the pathologic changes and the differential diagnosis and to report illustrative cases of each type. Love's conclusions are that in the vast majority of cases of acute or chronic leukemia there is clinical evidence of the disease in the ear, nose, mouth and throat. Symptoms of hemorrhage in the middle or internal ear; epistaxes, necrotic lesions in the mouth, throat or larynx; petechial or massive hemorrhages from the mucous mem-

brane of the mouth, the pharynx or the nose or from the gums after the extraction of teeth or any other operation in the mouth, nose or throat, extreme anemia of the same structures, and necrotic lesions of the larynx or cervical adenopathy without obvious cause all point to the possibility that the patient may be suffering from a blood dyscrasia, especially a form of leukemia. These findings together with the other general symptoms of this type of disease indicate the need of an accurate hematologic study.

Proetz[58] writes a very good article on the syndrome of pain and paralysis arising from inflammation of the prevertebral space. He describes the various symptoms as:

1. Deep pain, as of a muscle spasm, an inch to one side of the spinous processes anywhere between the seventh cervical and the third thoracic vertebrae. This is the most constant symptom.
2. Futile attempts to hold the head in some position which will relieve the deep cervicothoracic tension; partial relief of lying supine.
3. Radiation of the pain to the arm, involving any or all of the branches of the brachial plexus.
4. Weakness and paralysis of various muscles attributable to brachial neuritis.
5. Occipital pain and tenderness.
6. A sore spot in such proximity to the esophagus that a bolus of food, passing down the tube, increases the pain.
7. Inflammation of the pharyngeal lymph tissues or history of recent acute infection of these tissues.
8. Absence of fever or other severe systemic effects.

In view of their anatomic position and their nerve supply, complications of eruption of the wisdom teeth, both upper and lower, include many conditions which are properly classified as otorhinolaryngologic. Henry[59] has collected over seven hundred cases of complications, half of them taken from the published literature and the other half supplied to him by colleagues all over the world from their private notes. Since they include a number of cases in which a wrong diagnosis has been made and the patient has been subjected to ineffective other treatment, often for quite long periods of time, it seems that a report of some of these cases should be of value to the specialist in the ear, nose and throat. The cases are analyzed under four main headings, viz., the ear, the sinuses, the throat, and operative accidents relating to this field.

Costen[60] has studied the pathologic conditions of the mandibular joint due to various kinds of maloclusions. The chief complaint of each case was a "burning tongue".

In each case, during the examination, the pain was partially or completely relieved when the condyle was moved away and downward from the joint by interposing test disks between the jaws. The thickness of the disk pack was judged grossly by the looseness of the lower jaw.

The success with which permanent relief was obtained depended on dentures which increased the vertical dimension of the jaw and moved the condyle away from the range of the chorda tympani and auriculotemporal nerves.

Irritation of these nerves, especially the auriculotemporal, sufficient to produce reflex pains in the remaining branches of the mandibular nerve is proposed as the principal etiologic factor in the production of "burning tongue" or "neurosis of the mouth" without gross lesions.

A brief review of the literature on the syndrome of anemia, glossitis and dysphagia is given by Hoover.[61] The anemia is recognized as that reported as "Idiopathic hypochromatic anemia." The glossitis may more properly be described as an atrophic tongue and does not differ from that described in connection with other diseases. The dysphagia is often due to mechanical obstruction of the upper portion of the esophagus. The treatment consists of mechanical dilatations of the esophagus and the prescription of iron salts in adequate dosage with or without liver.

MALIGNANCY

Under the title of adenocarcinoma Watson[62] describes a group of forty-one loosely related tumors of the mouth, most of which seem, however, to be derivatives of the salivary gland tissues, resembling the well-known "mixed" types which occur in the parotid and submaxillary region.

These neoplasms occur anywhere in the oral cavity, but usually beneath the mucous membrane of the hard and soft palates, in the mucosa of the cheek, especially at the mouth of Stensen's duct.

Treatment varies with the individual case, but the routine at the Memorial Hospital includes preliminary external irradiation by divided doses of roentgen rays (though the author states that the growths are radioresistant), the implantation of gold radon seeds, and a final wide excision with the actual cautery. The five-year results are fairly good, 36.4 per cent of the patients who have been treated are alive and well.

The methods used at the Memorial Hospital in New York for the treatment of cancer of the lip have been gradually developed during the last twenty years as the result of accumulated experience in the treatment of over 1000 cases. In early cancer of the lip, according to Martin,[63] surgery, radiation, and cautery give an equally good chance of permanent cure, if prop-

erly employed, provided metastases to the neck have not occurred. The preference for radiation for these small primary lesions is based entirely upon the superiority of the cosmetic result. Large, advanced lesions for the most part offer little chance of a good cosmetic result by any method, and, in these, surgery is the method of choice from the standpoint of the shortest morbidity and a reasonably satisfactory functional result. Histologic confirmation of the clinical diagnosis is essential in cancer of the lip where curative treatment is intended, whether by surgery or radiation.

The author does not agree with the principle of giving prophylactic treatment to the neck either by surgery or radiation in the absence of palpably involved nodes.

In the group of patients with enlarged, palpable nodes in the neck, probably metastatic and operable, either radiation or surgery has been used. Only those cases in which the primary lesion was definitely to one side of the mid-line, and in which the primary lesion was either under control or clearly capable of being controlled, were considered as suitable for neck dissection.

During the last few years, with the better development of the technic of gold radon implantation and divided or protracted doses of external irradiation, the treatment of neck metastases by a combination of radiation and limited surgery has been more generally used.

Shambaugh[64] finds that fishermen in the Massachusetts region are exposed, in the handling of tarred nets, to the most strongly carcinogenic type of tar; namely horizontal retort gas-works tar. The lips are especially apt to be contaminated with the tar owing to the frequent practice of holding the tar-smeared needle in the mouth while repairing the nets, in eight cases of cancer of the lip in fishermen reported, it is believed that such an exposure to tar was an important causative factor.

These observations suggest that exposure to tar may be partially responsible for the apparent high incidence of cancer of the lip in fishermen.

Martin and Pflueger[65] find that cancer of the cheek is chiefly a disease of old age and is seen less often in young people than any other form of intraoral cancer. Chronic irritation is the most obvious etiologic factor. Definite evidence of dental irritation, either from sharp teeth or from ill-fitting dentures, was found in 23 per cent of the cases. Metastases tend to occur at a comparatively late stage of the disease.

In treatment, three problems must be considered: (1) the hygienic care of the oral cavity; (2) the primary lesion should be treated almost entirely by irradiation, and (3) the problem of the treatment of metastases should be considered separately. If no nodes are palpable at the time of admission, one treatment by external irradiation to the cervical region is given; following which no further treatment is administered to the neck until definite palpable evidence of the presence of metastasis appears. The authors are definitely opposed to prophylactic neck dissection. If metastases are present at the time of admission, it is the usual practice either to perform a radical neck dissection after treatment of the primary tumor or to insert gold seeds after the surgical exposure of the nodes by a short incision through the skin and subcutaneous tissues only. With the exclusion of the cases of advanced disease in which palliative treatment only was given, the primary tumor was controlled in forty-nine of the sixty-seven cases in which attempts at a cure were made. Five-year cures were obtained in twenty-eight patients or 30 per cent of the entire group.

If epithelioma of the lower lip can be determined clinically, a wide V-shaped excision followed by removal of the lymph nodes of the neck is recommended by New.[66] For more extensive lesions, a wide excision and a plastic operation at either angle of the mouth and upper lip are usually necessary to reconstruct the lower lip. In a series of 547 patients with epitheliomas of the lower lip, 357 survived five or more years after treatment. Five-year cures were obtained in 89.7 per cent of 234 patients with dissected but uninvolved cervical nodes, in 65.8 per cent of 196 patients in whom the nodes were not involved clinically and were not dissected, and in 39.1 per cent of forty-six patients in whom the nodes were involved and dissected.

In carcinoma of the tongue a wide removal of the growth with diathermy or the cutting cautery is advisable, where possible, as well as a bilateral dissection of the submental and upper cervical lymph nodes on the involved side if there is no extension to the lymph nodes. If the lymph nodes are involved, a block dissection on that side should be done. The highly malignant lesions which occur more frequently at the base of the tongue may be treated by the insertion of radium directly into the tumor by external irradiation. The removal of the cervical lymph nodes, however, is an essential part of the treatment of carcinoma of the tongue.

Of a series of 162 patients 37.2 per cent of the 156 traced patients were living five or more years after operation. Five-year cures were obtained in 50 per cent of fifty-eight patients in whom the nodes were not involved but were dissected; in 52.8 per cent of thirty-six patients in whom the nodes were not involved clinically and not dissected; in 14.3 per cent of fifty-six patients in whom the nodes were involved and

dissected; and in 33.3 per cent of six patients in whom the growth had extended to the floor of the mouth.

In the lesions which have spread to the cheek, the removal of the submental and submaxillary lymph nodes adds considerably to the chance of preventing extension to the neck. Five-year cures were obtained in ninety of 187 patients operated on for epithelioma of the lower jaw, which represented a relative curability of 59.6 per cent of the 151 patients traced. Twenty-eight and nine-tenths per cent of thirty-eight patients with node involvement and 69.9 per cent of 113 patients without node involvement lived five years or more after operation.

During the last fifteen years there has been a marked change in the treatment of malignant tumors of the upper jaw and antrum. It has been found that the use of cautery and irradiation eliminates the operative mortality and more patients are well without recurrence after this method of treatment than after the older methods of resection of the upper jaw. Two hundred and thirty-six of two hundred and ninety-five patients so treated, have been traced; 53.8 per cent have lived five or more years after treatment.

Kaplan,[67] Simpson,[68] and Livingston and Lieber[69] also write on the treatment of carcinoma of the tongue.

Quick[70] believes that complete unilateral neck dissection occupies a definite, yet very limited, field in the treatment of intraoral, pharyngeal, and laryngeal cancer. It should be reserved for those cases of fully differentiated epidermoid carcinoma, in patients of good general physical condition, in whom the primary growths have been controlled or give substantial promise of control and in which the metastatic nodes are unilateral, palpable, and present clinical evidence of an intact capsule. Care should be taken to differentiate the inflammatory nodes and inflammatory areas in the submaxillary salivary gland stimulating a node, and true metastatic nodes. With the exception of patients with lip cancers, in whom dissections limited to both submental groups and the submaxillary and upper deep cervical groups of the involved side are recommended, neck dissection should be the most radical possible. If no cervical lymph nodes are palpable, external irradiation is all that is indicated except for a follow-up at frequent intervals.

When these narrow limits on neck dissection are considered, it becomes apparent how diverse are the conditions in which implantation of radium must be employed. External irradiation can be depended upon only in the strictly anaplastic growths. Implantation of radium should not be resorted to for short-term palliation, which is a problem for external irradiation; but, should be planned with the idea of a substantial or complete control of the primary growth. Maximum external therapy should always precede implantation.

It is believed that the narrowing of the limits for neck dissection and the gradually increasing scope of interstitial irradiation of metastatic tumor in the cervical nodes have conferred a larger benefit on a greater number of patients than did the former plan of free resort to dissection without adequate selection of cases.

Fischel[71] describes in detail the technic of unilateral block resection of the lymph nodes of the neck for carcinoma, including the removal of the sternomastoid muscle, internal jugular vein, and omohyoid muscle. In a series of seventy-four private cases operated on between the years 1918 and 1935 by this technic, there were seven operative deaths, a mortality of 9.5 per cent.

Nineteen cases of malignant tumor of the nasopharynx encountered at the Massachusetts Eye and Ear Infirmary are reported by Heine.[72]

From the study of these cases these conclusions were drawn:

1. The nasopharynx bears a rather fertile soil for the development of the various types of neoplasm.
2. Any abnormality in the appearance of the tissue in this region is worthy of biopsy.
3. Tumors arising from the different kinds of epithelium covering over the vault of the nasopharynx are different both pathologically and clinically from most other epithelial tumors and evidently deserve some special classification.

The results in this series are in support of radiation therapy; but the follow-up was limited to a period too short for conclusions as to the permanency of results.

In a series of twenty-four malignant tumors of the epipharynx studied by Salinger and Pearlman[73] transitional cell carcinoma was, in the opinion of three pathologists, the most common type.

The early and characteristic symptoms of transitional cell carcinoma were found to be painless cervical adenopathy, tinnitus or deafness, and pains due to involvement of the first and second branches of the trifacial nerve.

In the majority of cases the tumor originated in the region of the eustachian tube or the lateral wall of the nasopharynx, thus accounting for the symptoms enumerated.

Lynch[74] discusses the pathologic changes that occur in tissues which have been exposed to radium in sufficient doses to cause a burn. The author classifies radium burns into three groups or stages.

1. The stage of engorgement. This is early and is the stage of slight erythematous swelling and subsequent complete recovery of the tissues.
2. The stage of constriction. This leads to

injury to the tissues; although no scar results, the tissues are definitely injured.

3. The stage of necrosis. Following the slough there is scar formation with atrophy of the tissues and permanent damage to the underlying structures with a possibility of trouble at a later date.

Heine[75] records observations made upon the behavior of ciliated epithelium after: (1) the exposure of hanging drop specimens of ciliated epithelium to the action of radon seeds; (2) the exposure of sections of rabbit's trachea to the direct action of roentgen ray; and (3) the implantation of a fixed dosage of radium in the nostrils of rabbits.

His conclusions are that goblet cells may be another form of ciliated epithelial cells and are probably degenerative. The metabolic rate of epithelial cells evidently is not affected by roentgen ray when the metabolic rate is measured by changes in the Ph., of the solutions containing the tissues. It seemed that some dosages of roentgen ray are actually stimulating. Ciliated epithelium is not a delicate structure in that it stands with impunity a 24 erythema single dose. A single dose of unfiltered roentgen ray of eight erythemas is the maximum for the skin of man.

Many very good articles have been written on the treatment of cancer of the larynx. The consensus indicates that when the growth is limited to one vocal cord it is operable by laryngofissure and curable in eighty per cent of cases. When the growth is extensive, laryngectomy still appears the best chance of cure. Without a question the Coutard method of x-ray therapy is a valuable adjunct in the treatment of the nonsurgical cases. With more experience it may replace surgery, but in the light of our present knowledge we feel that the operable case stands best chance of cure by surgery.

Garfin[76] reviews 202 cases, Harrison and Sarasin,[77] Lénárt,[78] Martin,[79] Harris,[80] Cutler[81] and Lenz[82] write on the x-ray treatment. Thomson[83] writes on laryngofissure. Chevalier Jackson and C. L. Jackson[84] state that malignant disease of the larynx is encountered in nine different forms: (1) Squamous-cell epithelioma, which is the commonest form and constitutes about 98 per cent of the cases; (2) basal-cell carcinoma; (3) glandular-cell carcinoma; (4) endothelium; (5) sarcoma; (6) malignant osteomyoma; (7) osteosarcoma; (8) a peculiar type of chondroma which destroys the entire larynx; and (9) precancerous conditions, potentially malignant, which are chiefly keratoses and leukoplakias.

Laryngofissure has advanced to the point where eighty-two per cent of cures can be obtained provided the operation is limited strictly to the type of case to which it is adapted. It affords operative access to the interior of the larynx by splitting the thyroid cartilage. It is indicated in intrinsic cancer of limited extent whatever the type or degree of malignancy. In cases in which the anterior wall of the arytenoid is involved, even though the growth has not yet become extrinsic, laryngofissure had better not be done if the malignancy is graded as III or IV. If, however, the tumor is of Grade I or II, laryngofissure is indicated. In such cases it is necessary to remove all of the corresponding arytenoid cartilage. If the growth has become even partially extrinsic by extension, it is beyond the limits of adequate removal by laryngofissure.

Laryngectomy is indicated in, (a) cases of intrinsic cancer of the larynx that have extended so far posteriorly that there is a probability that laryngofissure will be inadequate and (b) extrinsic malignant disease of limited extent as of Grade I or II. In every extensive growth of Grade I or II and in Grade III or IV growths irradiation is preferable to operation of any kind. In patients with cardiovascular disease, tuberculosis, nephritis, and diabetes, it is, in many cases, advisable to trust to radiation rather than to risk a major operation such as laryngectomy. Laryngofissure, on the other hand, is a relatively minor procedure and has few, if any, contraindications.

Recurrences take place in about eighteen per cent of cases after laryngofissure and in about forty per cent of cases after laryngectomy for carcinoma of the larynx. As a general rule irradiation by the Coutard technic is superior to further operation for these recurrences.

Buckley[85] says that the operation called laryngectomy is no longer in its infancy, but is rather a well-established and recognized procedure, with many hundreds of cancer cures standing to its credit.

To obtain the best results a preliminary biopsy is essential, not alone definitely to establish a diagnosis but also to insure that very important microscopic study which is so necessary in deciding what therapeutic procedure shall be instituted.

A series of laryngectomies seems to indicate that surgery still definitely stands out as the most powerful foe opposing cancer of the larynx.

REFERENCES

1. Hansel, French K.: Allergy of the Nose and Paranasal Sinuses. St. Louis: C. V. Mosby Co., 1936.
2. Buhrmester, C. C.: Chemical composition of secretions from allergic rhinitis and sinus exudates. Laryngoscope **45**:347 (May) 1935.
3. Cameron, J. A. M.: Investigation of part played by allergy or sensitization as factor in predisposing mucous membrane of nasal passages and paranasal sinuses to infection and its bearing upon treatment of disease of these cavities. J. Laryng. & Otol. **50**:493 (July) 1935.
4. Dean, L. W.; Linton, L. D., and Linton, C. S.: Intramucosal test for hypersensitivity in allergic rhinitis. Ann. Otol. Rhin. & Laryng. **44**:317 (June) 1935.
5. Alden, A. M.: Response of allergic phenomena to ionization. Laryngoscope **45**:620 (Aug.) 1935.

6. Bernheimer, L. B.: Effects of irradiation on allergic nasal mucosa; final report. Arch. Otolaryng. **22**:165 (Aug.) 1935.
7. Garfin, S. W., and Pearl, S. M.: Ionization in treatment of hay fever and allied conditions. New Eng. J. Med. **214**:244 (Feb. 6) 1936.
8. Hurd, L. M.: Treatment of hay fever and hyperesthetic rhinitis by ionization. Arch. Otolaryng. **22**:416 (Oct.) 1935.
9. Barrett, Henry A.: Galvanic ionization therapy in allergic rhinitis as employed at the Manhattan Eye, Ear and Throat Hospital. Laryngoscope **46**:262 (April) 1936.
10. McMahon, B. J.: Late changes in mucosa of frontal sinuses and nose of dogs following ionization. Arch. Otolaryng. **22**:454 (Oct.) 1935.
11. Dean, L. W.; Bronfenbrenner, J. J.; Alexander, H. L.; Hansel, F. K.; Proetz, A. W.; Alden, A. M.; Wenner, W. F.; Bunch, C. C.; McMahon, B. J.; Alexander, J. H., and Linton, L. D.: Allergic rhinitis, a panel discussion. Ann. Otol. Rhin. & Laryng. **45**:191 (March) 1936.
12. Sewall, E. C.: Sinusitis allergy and common cold; conception of their relationship. Arch. Otolaryng. **22**:425 (Oct.) 1935.
13. Blackmar, F. B.: Clinical biochemistry in treatment of ear, nose and throat diseases. Laryngoscope **45**:948 (Dec.) 1935.
14. Kracaw, F. C.: Treatment of chronic sinus infection with undenatured bacterial antigens. Laryngoscope **46**:26 (Jan.) 1936.
15. Ruskin, S. L.: Bacteriophage therapy in nasal and aural disease. Laryngoscope **46**:107 (Feb.) 1936.
16. Womack, D. R.: Use of undenatured bacterial antigen (Krueger). Laryngoscope **45**:554 (July) 1935.
17. Ruskin, Samon L.: Nucleic acid and nucleotide therapy in sinus disease. Arch. Otolaryng. **22**:172 (Aug.) 1936.
18. Russell, R. D.: Polypi of nasal septum; report of 2 cases. Laryngoscope **45**:698 (Sept.) 1935.
19. Brandenburg, N. B.: Polypi of nasal septum. Arch. Otolaryng. **22**:328 (Sept.) 1935.
20. Kramer, R., and Sem, M. L.: True papilloma of nasal cavity. Arch. Otolaryng. **22**:22 (July) 1935.
21. Chamberlin, William B.: Rhinoscleroma, is it an indigenous disease? Arch. Otolaryng. **23**:285 (March) 1936.
22. O'Malley, J. F.: Ventilation of nose and accessory sinuses. Oscillograph method of investigation. J. Laryng. & Otol. **50**:389 (June) 1935.
23. Thomson, St. C.: Defences of air passages; Semon lecture. J. Laryng. & Otol. **51**:1 (Jan.) 1936.
24. Viktorow, K.: Über die Wirkung einiger Arzneimittel auf das Flimmerepithel. Acta oto-laryng. **21**:61, 1934.
25. Renvall, E.: Recherches sur les mouvements des cils vibratiles au niveau de l'amygdale de Luschka. Acta oto-laryng. **22**:154, 1935.
26. Fetissow, A. G.: Die Wirkung der Ausschaltung der Nasenatmung auf die Struktur der Nasenschleimhaut. Acta oto-laryng. **21**:322, 1934.
27. Tchudnosovetof, V. A.: The influence of types of breathing on the injection of the mucosa of the nose after subarachnoidal introduction of China-ink. Acta oto-laryng. **21**:199, 1934.
28. Zoltán, L.: Chronische Tonsillitis und Schilddrüse. Acta oto-laryng. **22**:66, 1935.
29. Key-Aberg, H.: Contribution au diagnostic et au traitement des abcès périamygdaliens profonds. Acta oto-laryng. **22**:234, 1935.
30. Rubin, Herman: An unusually large calculus of the tonsil. Laryngoscope **46**:376 (May) 1936.
31. Meurman, Y.: Nerve block anesthesia for tonsillectomy and Horner's syndrome. Acta oto-laryng. **21**:184, 1934.
32. Alföldy, E.: Die Nasen-und Rachenerkrankungen als Ursachen von Dyshydrose und Ekzema. Acta oto-laryng. **22**:76, 1935.
33. Kallos, Paul: Über Vorkommen von Eosinophilzellen im Sekret der Nase, der Nebenhöhlen und der Tonsillen. Acta oto-laryng. **22**:107, 1935.
34. McLaurin, J. G.: Review of interrelationship of paranasal sinus disease and certain chest conditions, with especial consideration of bronchiectasis and asthma. Ann. Otol. Rhin. & Laryng. **44**:344 (June) 1935.
35. Hodge, G. E.: Relation of bronchiectasis to infection of paranasal sinuses. Arch. Otolaryng. **22**:537 (Nov.) 1935.
36. Fenton, R. A., and Larsell, O.: Research report on experimental and clinical sinusitis. Arch. Otolaryng. **23**:18 (Jan.) 1936.
37. Linton, C. Q.: The association of filtrable virus and bacteria in the production of experimental sinusitis. Ann. Otol. Rhin. & Laryng. **44**:948 (Dec.) 1935.
38. Lierle, D. M., and Moore, P. M.: Further study of effects of drugs on ciliary activity: new method of observation in living animal. Ann. Otol. Rhin. & Laryng. **44**:671 (Sept.) 1935.
39. Boling, L. R.: Regeneration of nasal mucosa. Arch. Otolaryng. **22**:689 (Dec.) 1935.
40. Mithoefer, William: Surgical approach to the nasal accessory sinuses. Laryngoscope **46**:266 (April) 1936.
41. Sewall, E. C.: Operative treatment of nasal sinus disease. Ann. Otol. Rhin. & Laryng. **44**:307 (June) 1935.
42. Luongo, R.: External frontoethmosphenoidal operation. Laryngoscope **46**:1 (Jan.) 1936.
43. Chase, Walter D.: The Sewall sphenoid sinus operation, modified. Laryngoscope **46**:181 (March) 1936.
44. McNaught, Robert C.: A refinement of the external frontoethmosphenoid operation. Arch. Otolaryng. **23**:544 (May) 1936.
45. Good, R. H.: Frontal sinusitis; conclusions arrived at from over 300 intranasal operations. Laryngoscope **45**:389 (May) 1935.
46. Skillern, S. R.: Obliterative frontal sinusitis. Arch. Otolaryng. **23**:267 (March) 1936.
47. Kramer, R.: Actinomycosis of the sphenoid with actinomycotic meningitis and brain abscess. Ann. Otol. Rhin. & Laryng. **44**:973 (Dec.) 1935.
48. Gundrum, L. K., and Semenov, H.: Treatment of sinusitis by displacement method, using ephedrin and bacterial antigens. Laryngoscope **45**:858 (Nov.) 1935.
49. Warren, E. D.: Value of x-ray therapy in chronic sinusitis. Laryngoscope **45**:864 (Nov.) 1935.
50. Hoover, W. B., and Horrax, G.: Osteomas of nasal accessory sinuses, with report of case illustrating transcranial approach to orbital structures. Surg. Gynec. & Obst. **61**:821 (Dec.) 1935.
51. Bryant, B. L.: Osteoma of ethmoid. Report of case. Laryngoscope **45**:854 (Nov.) 1935.
52. Carmody, T. E.: Osteoma of nasal accessory sinuses. Ann. Otol. Rhin. & Laryng. **44**:626 (Sept.) 1935.
53. Gatewood, W. L., and Settel, N.: Osteoma of frontal sinus; review of literature and report of case presenting extended invasion of orbit. Arch. Otolaryng. **22**:154 (Aug.) 1935.
54. Burnham, H. H.: Anatomical investigation of blood vessels of lateral nasal wall and their relation to turbinates and sinuses. J. Laryng. & Otol. **50**:569 (Aug.) 1935.
55. Swindle, P. F.: The architecture of the blood vascular networks in the erectile and secretory lining of the nasal passages. Ann. Otol. Rhin. & Laryng. **44**:913 (Dec.) 1935.
56. Cody, Claude C., Jr.: Brucellosis in otolaryngology. Arch. Otolaryng. **23**:441 (April) 1936.
57. Love, A. A.: Manifestations of leukemia encountered in otolaryngologic and stomatologic practice. Arch. Otolaryng. **23**:173 (Feb.) 1936.
58. Proetz, A. W.: Syndrome of pain and paralysis arising from inflammations of prevertebral space. Ann. Otol. Rhin. & Laryng. **44**:371 (June) 1935.
59. Henry, C. Bowdler: Misplaced wisdom teeth and the oto-rhino-laryngologist. J. Laryng. & Otol. **51**:293 (May) 1936.
60. Costen, J. B.: Glossodynia;—reflex irritation from mandibular joint as principal etiologic factor; study of 10 cases. Arch. Otolaryng. **22**:554 (Nov.) 1935.
61. Hoover, W. B.: Syndrome of anemia, glossitis, and dysphagia; report of cases. New Eng. J. Med. **213**:394 (Aug. 29) 1935.
62. Watson, W. L.: Adenocarcinoma of oral cavity. Am. J. Roentgenol. **34**:53 (July) 1935.
63. Martin, H. E.: Treatment of cancer of lip. Am. J. Surg. **30**:215 (Nov.) 1935.
64. Shambaugh, P.: Tar cancer of lip in fishermen. J. A. M. A. **104**:2326 (June 29) 1935.
65. Martin, H. E., and Pflueger, O. H.: Cancer of cheek (buccal mucosa); study of 99 cases with results of treatment at end of 5 years. Arch. Surg. **30**:731 (May) 1935.
66. New, G. B.: Malignant disease of mouth and accessory structures. Am. J. Surg. **30**:46 (Oct.) 1935.
67. Kaplan, I. I.: Radiation therapy of malignancy of tongue. Am. J. Surg. **30**:227 (Nov.) 1935.
68. Simpson, F. E.: Radium dosage and technique in carcinoma of tongue. Am. J. Roentgenol. **34**:63 (July) 1935.
69. Livingston, E. M., and Lieber, H.: Surgical aspects of treatment of carcinoma of tongue. Am. J. Surg. **30**:234 (Nov.) 1935.
70. Quick, D.: Metastatic epidermoid carcinoma in neck; technical considerations in combined method of treatment. Am. J. Surg. **30**:207 (Nov.) 1935.
71. Fischel, E.: Unilateral block resection of lymph nodes of neck for carcinoma. Am. J. Surg. **30**:27 (Oct.) 1935.
72. Heine, L. H.: Malignant tumors of nasopharynx. Arch. Otolaryng. **22**:51 (July) 1935.
73. Salinger, Samuel, and Pearlman, Samuel J.: Malignant tumors of the epipharynx. Arch. Otolaryng. **23**:149 (Feb.) 1936.
74. Lynch, M. G.: Pathology of radium burns. Arch. Otolaryng. **21**:507 (May) 1935.
75. Heine, Lyman H.: The effect of radiation upon ciliated epithelium. Ann. Otol. Rhin. & Laryng. **45**:60 (March) 1936.
76. Garfin, S. W.: Cancer of larynx; study of 202 cases with end-results. New Eng. J. Med. **213**:1109 (Dec. 5) 1935.
77. Harrison, R. S., and Sarasin, R.: Malignant disease of larynx and pharynx. J. Laryng. & Otol. **50**:233 (April) 1935.
78. Lénárt, Z. V.: Zur chirurgischen Behändlung des Kehlkopfkarzinoms. Acta oto-laryng. **22**:83, 1935.
79. Martin, Charles E.: Irradiation therapy of malignant tumors of the oral cavity, eye, ear, nose and throat. Ann. Otol. Rhin. & Laryng. **44**:426 (June) 1935.
80. Harris, W.: Neoplasms of oral and upper respiratory tracts treated by protracted roentgen therapy. Am. J. Roentgenol. **34**:482 (Oct.) 1935.
81. Cutler, M.: Radium dosage and technique in carcinoma of tonsil, pharynx, and larynx. Am. J. Roentgenol. **33**:690 (May) 1935.
82. Lenz, M.: Radiotherapy of cancer of larynx. Am. J. Surg. **30**:259 (Nov.) 1935.
83. Thomson, St. C.: Three cases illustrating the permanency of cure and adequate voice after operation for intrinsic cancer of the larynx by the laryngofissure route. Proc. Roy. Soc. Med. **29**:187 (Dec.) 1935.
84. Jackson, C., and Jackson, C. L.: Malignant disease of the larynx; its treatment by laryngofissure and laryngectomy. Am. J. Surg. **30**:3 (Oct.) 1935.
85. Buckley, R. E.: Series of cases of total laryngectomy for cancer. Laryngoscope **45**:769 (Oct.) 1935.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 22381

PRESENTATION OF CASE

A fourteen year old native schoolgirl was admitted complaining of swelling of the neck glands.

The patient was perfectly well until six months before entry, when she developed a cold associated with a slight cough and nasal discharge. At the same time a swollen gland appeared beneath the left jaw. A physician advised bed rest and the patient remained in bed for two weeks, during which time both the cold and the swollen gland subsided. A month later the patient again caught cold and for the second time a gland appeared on the left side of the neck. During the succeeding few weeks the patient had a slight but persistent sore throat and a mild unproductive cough. The gland in the neck remained slightly tender. She improved and returned to her usual activities until two months before entry when exactly the same syndrome reappeared. This time she had some malaise and fatigability. She was sent to a sanatorium where x-rays revealed an increase in density and evidence of calcification in the right lung hilum. Extending outward from the left hilum into the parenchyma there was a large rounded area of increased density with an irregular margin. Subsequently the patient felt entirely well, the neck glands disappeared and she gained eight pounds. An intradermal tuberculin test was negative. She entered the hospital for study.

Physical examination showed a well-developed and nourished elderly looking young girl in no discomfort. The nose was clear and the throat negative. Discrete nontender nodes were palpated in both sides of the neck, in the angle of the jaws, and a few were felt in the left sternal mastoid and left supraclavicular regions. The lungs were negative. The heart was normal. The blood pressure was 125/75. The remainder of the examination was negative.

The temperature, pulse, and respirations were normal.

Examination of the urine was negative. The blood showed a red cell count of 5,000,000, with a hemoglobin of 85 per cent. The white cell count was 6,000, 65 per cent polymorphonuclears. A stool examination was negative. Several tuberculin tests with dilutions of 1:40,000 to 1:100 were negative.

X-ray examination showed the left diaphragm to be slightly higher than the right but both sides moved equally and poorly. The heart was slightly rotated to the right and there was a 5 x 4 cm. area of dulness extending from the upper part of the hilus into the left upper lung field. It was ill defined and showed linear projections into the surrounding lung field. The remainder of the lung fields and the costophrenic angles were clear. The lateral view showed the area of dulness to lie in front of the plane of the trachea. It was well defined anteriorly but the outer margins were hazy. The lung markings of the upper lobe were slightly prominent and the interlobar septum seemed to bulge slightly upward.

A bronchoscopy showed a normal larynx. Examination of the bronchial tree was entirely negative except for slight redness of the upper lobe bronchus on the left side in which there appeared a small amount of mucoid secretion. The patient's condition remained relatively unchanged. On the nineteenth hospital day a series of x-ray treatments to the chest was instituted. This was completed in six days, and x-ray examination at that time and again a week later showed no appreciable change in the shadow. Three weeks later, on the forty-seventh hospital day, a left thoracotomy was performed.

DIFFERENTIAL DIAGNOSIS

DR. FREDERICK T. LORD: The x-ray films are of interest from the statement that those taken elsewhere showed increased density and evidence of calcification at the right root. Calcification of intrathoracic glands, if present, may be taken to indicate tuberculosis. In these films the increased density at the right root does not exceed the normal. There are several round, homogeneously dense shadows in this region and beside one of them is a bronchus. I see no evidence of calcification and think the shadows at the right root are due to vessels on end rather than tuberculous glands.

The involved area on the left side lies in a plane in front of the trachea.

The history is rather brief and it would in addition be desirable to know if the patient still had cough and expectoration. As some bronchial secretion of a mucoid character was demonstrated by means of the bronchoscope, its examination would be desirable. We would like to know if she had shortness of breath, pain, wheezing, night sweats or chills, and the result of the Hinton test.

With respect to the physical examination, the succession of respiratory infections and the

subsidence to a large extent of the cervical glandular enlargement suggest that the adenitis was of inflammatory origin. Owing to their possible importance in the problem, it is, however, unfortunate that their size is not stated. As no mention is made of a biopsy and an exploratory thoracotomy was done, the inference may be drawn that they were not regarded as of special significance with respect to the thoracic condition.

Dr. Tracy B. Mallory: Biopsy was attempted but no gland was found when they got in and only a bit of muscle was removed.

Dr. Lord: We have to consider certain inflammatory conditions, particularly tuberculosis. There is no evidence of glandular tuberculosis at the right root and negative intracutaneous tests with tuberculin up to and including one milligram are almost certain evidence against any active tuberculous process. Incidentally I may say that I do not think that any useful information is obtained by tests with highly diluted tuberculin. Tests in sequence with dilutions of 1:10,000, 1:1,000 and 1:100 are satisfactory.

Of other inflammatory conditions, actinomycosis may be mentioned, but more evidence of an inflammatory process may be expected. Though I have seen actinomycosis of the root of the lung with radiating projections into the neighborhood, I am inclined to dismiss it from serious consideration.

A third possibility is a sarcoid of Boeck, but as no lesions of the skin or mucous membranes are mentioned and so far as the lung is concerned the disease is likely to present a diffuse mottling in the lower and middle parts of the lung fields, I am inclined to dismiss that also.

Some sort of neoplasm is left for consideration. Of the benign newgrowths, a dermoid cyst or neuroblastoma is likely to be more sharply outlined and without linear projections into the neighborhood. Of the two, only the dermoid is likely to be in the anterior part of the chest. I am inclined to exclude these two types of benign neoplasm.

A malignant newgrowth is left for consideration. Between carcinoma and lymphoblastoma, the former is more likely, though she is young for carcinoma. If carcinoma, it is of the branch-bronchus type in view of the negative bronchoscopy. Some intimation of carcinoma is presented by the radioresistance of the mass. Then, too, there is some suggestion of bronchial occlusion with atelectasis from the high left diaphragm and the bulging upward of the interlobar septum.

Lymphoblastoma is difficult to exclude, especially in the face of the enlarged cervical glands, but I am inclined to regard these glands as of inflammatory origin. Then, too, lymphoblastoma is usually radiosensitive and the x-ray was without effect here.

In conclusion, I would say that I cannot make a distinction between carcinoma and lymphoblastoma, but the chances seem in favor of carcinoma.

Clinical Discussion

Dr. Donald S. King: At the time of her admission to this hospital this patient was in very good condition. A number of doctors who examined her thought that she was too well to justify operation. Tuberculosis was ruled out by the negative tuberculin test with a 1:100 dilution. The diagnosis of lymphoma was eliminated when the x-ray treatment had no effect. Almost everyone felt that the lesion was a tumor although we did have in mind a boy of about the same age who was thought to have had a tumor but whose operation showed a congenital cyst full of inspissated pus. His x-ray film differs from that of the patient under consideration because one can see the cyst containing air and pus. Occasionally a lung abscess with a gelatinous type of pus gives a shadow similar to that shown in the case of this cyst. We had this case in mind for comparison with the present case, but we did not feel justified in drawing the conclusion that the second case was cyst and not tumor. The preoperative diagnosis therefore was tumor, and carcinoma seemed a definite possibility.

This postoperative film is interesting because, although the supposed tumor mass has been removed, a large shadow persists in the region where the operation was performed. At the time of operation large inflamed glands were shown in this region, and we believe that the shadow in this film is the result of these enlarged glands. This is the second case in which Dr. Churchill has taken out an upper lobe and left the lower lobe. It will be noted in the postoperative film that the lower lobe has now expanded and filled the entire region previously occupied by the upper lobe on this side.

Preoperative Diagnosis

Benign tumor of the left lung.

Dr. Frederick T. Lord's Diagnoses

Inflammatory cervical adenitis.
Malignant tumor of the lung (carcinoma)?

Pathologic Diagnoses

Cylindrical bronchiectasis of the major bronchi.
Pulmonary fibrosis.
Organized thrombosis of branches of the pulmonary artery.

Pathologic Discussion

Dr. Mallory: The specimen which we received was the upper lobe of the lung, and close to the hilum there was a cavity of considerable size from which in the course of operation I believe Dr. Churchill liberated a good deal of inspissated pus, such as Dr. King has described. There was no pus in it when it reached us. It appeared to be a marked dilatation of the main bronchus to the lobe and its first two subdivisions. If that was the case I do not see why the bronchoscopy was reported as negative. The lung in the surrounding hilar region showed a very extensive grade of pneumonitis and fibrosis, which must have produced part of the very dense shadow. The lung beyond that point was atelectatic. There was no evidence of an infectious process in the peripheral part of the lung and the border of the very intense and fibrotic process in the hilar region was sharp. There were also several quite large branches of the pulmonary artery which were completely thrombosed. I do not see any way in which one can guess whether that thrombosis was secondary to pulmonary inflammation or whether it might not have been the other way, that the thrombosis was primary and the localized area of destruction of the lung secondary.

If the structure was in the nature of a congenital cyst one must assume that there developed a secondary inflammatory process later and I was more inclined to regard it as an atypical form of cylindrical bronchiectasis limited to the major bronchi.

Dr. King: It was different from this other cyst?

Dr. Mallory: Yes. The bronchial cartilages found in the wall of the cyst showed extensive bone formation which is a very common thing in elderly people but most unusual in a girl of fourteen suggesting that a degenerative process had been going on for quite a number of years.

CASE 22382

Presentation of Case

An eighteen year old white girl was admitted complaining of pain in the right arm.

Ten months before coming to the hospital the patient began to have a rather constant dull aching pain in the right arm. There were no acute exacerbations, nor did the pain interfere with her sleep. Initially there was no disturbance of motility of the extremity. About five months prior to entry, the pain became quite severe and necessitated the administration of codein. She was hospitalized for four days, during which time she was found to have a daily afternoon temperature of 100°. She was told that there was fluid in the right chest but was treated only with ice packs and medication. Following her discharge she remained in bed for about one month, during the first few days of which she could not move her right arm. Subsequently her fever subsided but the aching pain in the arm returned and she took codein quite regularly for it. Three months before admission she was examined at a sanatorium and told that she had no evidence of tuberculosis. Three weeks before entry the pain again became severe and she noted diminished strength in the affected arm. There was a sensation of numbness along the inner aspect of the arm from the axilla to the hand, and the fourth and fifth fingers on that side were quite weak. She lost thirteen pounds during the three months preceding her entry.

Physical examination showed a well-developed but slightly undernourished girl in no acute discomfort. The skin over the left side of the face and neck was moist but that on the right side was dry. The right palpebral fissure was narrower than the left and the right pupil smaller. The retinal veins were distended bilaterally. The anterior jugular vein was more prominent on the right side and the superficial veins over the upper right thorax and lower neck exhibited increased prominence also. The trachea was displaced to the left and a questionable mass was palpated behind the medial half of the right clavicle and sternal notch. There was slight scoliosis to the left in the upper dorsal region and slight respiratory lag of the right upper chest. The right breast was slightly larger than the left. There was flatness anteriorly from the supraclavicular notch down to the first interspace and distinct bronchial breathing was audible in this region. Tactile fremitus and vocal resonance were also diminished in the same region. Posteriorly from the supraspinous fossa to the level of the third rib similar signs were elicited. The heart was normal and the blood pressure was 100/70 in both antecubital fossae. The abdomen was negative. The right palm was dry and somewhat scaly and there was atrophy of the small muscles of this hand. The right forearm was smaller than the left and the patient was unable to grip with the right hand. She was also unable to extend the third, fourth and fifth fingers of this hand. An area of anesthesia was demonstrated from the axilla down to the medial aspect of the arm, including the fourth and fifth fingers and the lateral portion of the third. Deep reflexes were all present but slightly less active in the right upper extremity.

The temperature, pulse and respirations were normal.

Examination of the urine was negative. The blood showed a red cell count of 5,200,000, with a hemoglobin of 80 per cent. The white cell count was 7,400, 74 per cent polymorphonuclears.

A stool examination was negative. Hinton and tuberculin tests were negative. The basal metabolic rate was plus 2 and skin tests with echinococcus antigen were negative.

X-ray examination showed that the right diaphragm was slightly higher than the left and the right upper lung field contained a round mass, measuring about 12 centimeters in diameter, extending from the utmost tip of the lung field downward. It occupied the whole right chest in this region in the transverse diameter and almost the entire chest in the anterior posterior diameter. The esophagus was displaced to the left by the mass, which extended across the midline. There was no erosion of the ribs but there was questionable very slight erosion of the anterior aspect of some of the upper dorsal vertebrae. Laterally the mass blended with a shadow which accompanied the lateral chest wall. There was slight decrease in aeration of the lung on the right side. The heart was small and the lung fields were otherwise normal.

On the ninth hospital day the patient suddenly developed what appeared to be laryngeal obstruction which amounted to almost complete asphyxia. She was rushed to the operating room and an intratracheal tube was inserted through a laryngoscope. Marked edema of the glottis was noted. Some improvement ensued but the dyspnea again occurred on the following day. A tracheotomy was done and the posterior portions of the three right upper ribs were resected in order to decompress the thorax. She died on the fifteenth hospital day, four days after the thoracoplasty.

Differential Diagnosis

Dr. Richard H. Sweet: This is an interesting case because to me it illustrates a distinct clinical entity, that due to a tumor located in the thoracic inlet which causes pressure on the brachial plexus.

This is a young girl of eighteen. The outstanding presenting symptom was pain in the arm. That might mean almost anything. As I started to read the record I thought first of all of a cervical rib. We quickly see, however, that it is not that. Going through the history we find that she had a pain for months and then finally developed diminished strength in the arm and also numbness and tingling down along the course of the ulnar nerve. Later she had interosseous muscle contraction and some atrophy of the hypothenar muscles, which confirms the diagnosis of interference with the ulnar nerve.

We note on physical examination that she lost weight. There are some very interesting findings also, such as absence of sweating on the right side of the face and a typical Horner's syndrome with exophthalmos and contracted pupils. The veins of the right neck were dilated, suggesting pressure on the innominate or jugular vein on the right. There were also flatness to percussion and bronchial breathing over the upper part of the chest. She also had, as you will see, some involvement of the intercosto-humeral nerve because she had interference with sensation and pain along the inner side of the upper arm. It is interesting to observe that she had no cough, no sputum and no hemoptysis. In the laboratory examination the interesting facts are that the tuberculin test was negative; the Hinton was negative and the echinococcus complement fixation test was negative.

This picture is perfectly typical for the so-called superior sulcus tumor which was first described by Pancoast* of Philadelphia. He says, "The tumors in question seemed to occur at a definite location at the thoracic inlet, were characterized clinically by pain around the shoulder and down the arm, Horner's syndrome and atrophy of the muscles of the hand, and presented roentgenographic evidences of a small homogeneous shadow at the extreme apex, always more or less local rib destruction and often vertebral infiltration. Death occurred as a result of what seemed to be a comparatively trivial growth without detectable metastases roentgenologically. The tumors were differentiated from other neoplasms occurring in the neighborhood, such as apical primary lung carcinoma and sarcoma of the ribs, by the absence of one or more of the foregoing characteristic manifestations."

Then we read the x-ray report and find that she has a large tumor in the upper part of the chest. There is no rib destruction, but there is some vertebral destruction.

Dr. George W. Holmes: Of course the tumor is large. There is no evidence of rib or bone destruction, which is quite important; even if this was an aneurysm you would expect some erosion of the sternum or the ribs in front. It has displaced the esophagus and trachea. In this straight lateral view it is evident that the mass extends almost across the upper part of the chest, a little more forward than backward but I really think must arise from the middle mediastinum.

This is the oblique view, but it does not rule out a mass arising from the aorta. However, I think aneurysm is very unlikely from the character of the x-ray.

Dr. Sweet: The history is perfectly typical of a Pancoast tumor but, as Dr. Holmes says, the x-ray is not, because this is a much larger tumor than any of the ones we have called superior sulcus tumors.

The final course is interesting because she developed obstruction from the tumor with pres-

*Pancoast, Henry K.: Superior pulmonary sulcus tumor. J. A. M. A., 99: 1391 (Oct. 22) 1932.

sure on the trachea, although they attempted to relieve it by decompressing the upper part of the tumor. She finally died.

I think this is an interesting case because it brings out the clinical syndrome that we associate with malignant tumors in the apex of the lung, with early involvement of the lower cords of the brachial plexus. What the histology is, I do not know, but I should rather guess it showed carcinoma. Of course the apex of the chest cavity is a location where we sometimes have a neurofibroma which should be mentioned in the differential diagnosis. We must admit in considering the diagnosis of carcinoma that this is a rather large tumor to go without causing bleeding or other evidence of malignant disease, but I should be inclined nevertheless to guess that it is a case of carcinoma of the lung.

Clinical Discussion

Dr. John D. Stewart: I do not think there is any particular point in discussing the operation in detail. She developed this sudden respiratory obstruction and all that we intended to do was to take away enough of the bony thorax so that the tumor could extend upward instead of pressing against the trachea, and although she was relieved somewhat I do not believe she was helped very much.

There is one point in the symptomatology that I would like to speak of. I saw this woman on the ward about a day or so before this sudden respiratory obstruction developed and she had the same symptom that was described in the first case that we took up today;* that is, she could breathe much more easily lying down than she could sitting up. This was quite striking. Her breathing in bed seemed apparently entirely free but the moment you asked her to sit up it became very difficult for her to breathe, which, I presume, means it was entirely a matter of mechanical compression of the trachea or bronchi, the pressure being relieved somewhat by change of posture.

Clinical Diagnoses

Preoperative: Tumor of the lung.
Postoperative: Neurofibroma of the mediastinum.
Mediastinal edema.
Tracheobronchitis.
Bronchopneumonia.

Dr. Richard H. Sweet's Diagnoses

Carcinoma of the lung, "superior sulcus tumor" type.

Anatomic Diagnoses

Fibrosarcoma of the mediastinum, probably neurogenic.
Compression of the trachea.
Acute tracheitis and bronchitis.
Bronchopneumonia.
Thrombosis of the right jugular vein.
Congenital anomaly—five lobes of right lung.
Operative wounds: Tracheotomy, exploratory thoracotomy.

*Case number 22351, August 27, 1936.

Pathologic Discussion

Dr. Tracy B. Mallory: The autopsy on this patient showed a very large tumor occupying the upper portion of the pleural cavity and displacing the upper lobe of the right lung. It was not entirely apparent at the autopsy from what portion of the mediastinum it actually arose. It certainly did not come from the thymus. That was identified and proved negative. In all probability it came from the posterior mediastinum, though it had infiltrated diffusely enough so that we were not able to be absolutely certain about that. It certainly did involve the sympathetic chain and the lower nerves of the brachial plexus, as the clinical symptomatology told us that it must. The jugular vein on that side also proved to be thrombosed. A great deal of interference with return of venous circulation from the head and occasionally from the upper extremities is common in these tumors that are placed right in the thoracic outlet. The dyspnea was obviously due to a marked compression of the trachea. In the last hours of life a significant amount of bronchopneumonia developed.

The biopsy of the tumor removed at the time of the emergency operation showed two types of cells. The majority were huge oval and spindle shaped cells, but little clusters of cells were also found that looked epithelial. At autopsy we had an opportunity to take many more sections but these showed only the spindle cell variety. When we originally found two types of cells present we thought we were dealing with teratoid tumor. The autopsy has failed to back that diagnosis up, and I think we now have to make a diagnosis of fibrosarcoma, again presumably of neurogenic origin.

An interesting finding at the autopsy was the discovery of a congenital anomaly of the right lung, which was divided into five well-marked lobes. This had of course no direct bearing on the symptomatology of the case but it might well have caused the surgeon considerable perplexity if he had been in a position to attempt a lobectomy.

A Physician: Was there any evidence of metastasis?

Dr. Mallory: No; the immediate lymph nodes were enlarged but they are negative microscopically.

The New England
Journal of Medicine

SUCCESSOR TO
THE BOSTON MEDICAL AND SURGICAL JOURNAL

Established in 1828

Published by THE MASSACHUSETTS MEDICAL SOCIETY under the jurisdiction of the

COMMITTEE ON PUBLICATIONS

R. I. LEE, M.D., *Chairman* R. M. SMITH, M.D.
R. B. OSGOOD, M.D. F. H. LAHEY, M.D.
J. P. O'HARE, M.D.

EDITORIAL STAFF

JOHN P. SUTHERLAND, M.D. JOHN F. FULTON, M.D.
GEORGE R. MINOT, M.D. STEPHEN RUSHMORE, M.D.
FRANK H. LAHEY, M.D. HANS ZINSSER, M.D.
SHIELDS WARREN, M.D. BENJAMIN WHITE, PH.D.
GEORGE L. TOBEY, JR., M.D. HENRY R. VIETS, M.D.
C. GUY LANE, M.D. ROBERT M. GREEN, M.D.
WILLIAM A. ROGERS, M.D. CHARLES C. LUND, M.D.
DWIGHT O'HARA, M.D. A. WARREN STEARNS, M.D.

ASSOCIATE EDITORS

ROBERT N. NYE, M.D. GEORGE G. SMITH, M.D.
JOSEPH GARLAND, M.D. WILLIAM B. BREED, M.D.

WALTER P. BOWERS, M.D., *Managing Editor*
CLARA D. DAVIES, *Assistant Editor*

THE NEW HAMPSHIRE MEDICAL SOCIETY
PUBLICATION COMMITTEE
CARLETON R. METCALF, M.D. HENRY H. AMSDEN, M.D.
WARREN H. BUTTERFIELD, M.D.

THE VERMONT STATE MEDICAL SOCIETY
PUBLICATION COMMITTEE
WILLIAM G. RICKER, M.D. C. F. DALTON, M.D.
L. H. ROSS, M.D.

SUBSCRIPTION TERMS: *$6.00 per year in advance, postage paid for the United States, Canada $7.04 per year, $8.52 per year for all foreign countries belonging to the Postal Union.*

Material for early publication should be received not later than noon on Saturday. Orders for reprints must be sent to the Journal office, 8 Fenway.

The Journal does not hold itself responsible for statements made by any contributor.

Communications should be addressed to The New England Journal of Medicine, 8 Fenway, Boston, Mass.

STERILIZATION OF THE UNFIT

LIKE so many steps in our progress toward Utopia, the theory and practice of sexual sterilization of human beings do not go hand in hand. Few would refuse to admit, even on moral grounds, the advantages of preventing the propagation of the mentally unfit. The care of the mentally defective and those individuals suffering from the more serious forms of mental disease places an ever-increasing burden on the taxpayers and, theoretically at least, is a failure in modern eugenics. Must we continue along the same path as in the past, or is there an effective remedy at hand which will lead us to the end, that all men shall have a sound mind in a sound body? Before the problem can be solved we must look at the facts as we visualize them today.

Only a very small percentage of mental disease or defect is definitely and unquestionably hereditary. Idiots and imbeciles often are the product of normal parents, who have normal children both before and after the birth of the defective. It must be admitted, morever, that defective persons have propagated normal, and even supernormal, children. Who is to say that the moronic father may not have a genius in his loins? Although the chances of such are obviously small, the fact cannot be overlooked that persons who have been of great use to the world have been born of unstable and even defective parents. The decision to sterilize a defective is not one that the state is ready to assume, except on voluntary application. This, naturally, in many cases, the defective cannot, or is not in a position, to make. It would seem best, on the whole, for society to pocket the loss entailed in custodial care, especially in view of the possibility of a hidden asset of a superior individual which might be also lost. In most cases nature kindly prevents conception and our troubles are not so grave as they appear. It is only in a few cases that the advantages of sterilization of the defective appear to be important. Morons, both male and female, are often easily excited sexually and, in addition, lack the moral control vested in most people of sound mind. Confinement of these in hospitals and schools is considered obligatory. If sterilized, this small class might find some useful pursuit outside of an institution. The gain, either from the economic or the social aspect would, however, be small. It must be remembered that there are other crimes than sexual, that can be committed by people of feeble mentality. The taxpayer might easily find that his bill for crimes of other sorts more than offset the cost of institutional care. The problem thus might become greater than that created by sexual sterilization.

If we cannot justify or urge sterilization of the mental defective, we have even less grounds for the procedure in mental disease. In a recent survey by the American Neurological Association, only one disease, and that exceedingly rare, was shown to be unmistakably hereditary. The Commission that made the prolonged investigation, moreover, felt that even this disease might occasionally not be passed from parent to child. If these facts are so, and we have no reason to doubt them, in what patients with mental disease could sterilization be made mandatory by law?

Common sense points to only one conclusion. Until we know more about mental disease and mental defect, laws to prevent propagation by sterilization are unwise. The problem is not so simple as smallpox vaccination, where lawful protection of the communities is overwhelmingly favored as a justifiable act. In the case of mental disease or defect, we still must know more in regard to hereditary mechanisms, before such drastic action as mandatory sexual sterilization should appear on our statute books.

A SUIT AGAINST A PHYSICIAN

A WOMAN appealed to her family physician for advice as to the proper procedure, alleging that her husband had threatened to shoot her and in connection with the threat had exhibited a revolver.

The doctor brought the matter to the attention of the local judge and this physician and an associate were appointed to examine the husband and submit a report to the judge. On the receipt of the medical report the judge committed the husband to one of the State hospitals for mental diseases for observation. When taken into custody by the police officer for the purpose of delivering him to the hospital, an unloaded revolver was found on the person of the patient.

After several weeks' observation in the hospital the patient was discharged as *not insane*.

The husband has now brought suit against the doctor who was appealed to by the wife, including in the declaration that "the defendant maliciously devising and intending to injure the plaintiff did on the sixth day of May 1933 falsely and maliciously and without any reasonable and probable cause make an application for his commitment to a hospital for the insane".

In the declaration it is further charged "that the defendant, well knowing that the plaintiff was sane, caused an assault with force and arms to be made upon the plaintiff and caused him then and there to be taken and imprisoned and restrained".

Next comes an interesting feature of the case, especially to physicians, because the doctor carried indemnity insurance with the United States Fidelity and Guaranty Company for his protection in claims for malpractice. This company declines to acknowledge liability in a suit for malpractice in this case with the statement, "You will observe that the claim is that you acted falsely, maliciously and wilfully to have the plaintiff committed" and further "This is entirely different from a charge of malpractice, error or mistake" and reference is made to a decision of the Massachusetts Supreme Judicial Court in the case of Niver v. Boland 177 Mass. 11.

The letter of the United States Fidelity and Guaranty Company disclaims any responsibility under its policy for any judgment against the doctor. Even so, the Company is willing to have its attorneys conduct the defense, but does not state how much would be charged for this service.

The next reasonable move is for the doctor to consult the proper officers of the Massachusetts Medical Society, under his rights as a member, for the Society will provide legal advice and court service for the purpose of conducting defense when a member is accused of malpractice or illegal transactions in connection with the commitment of persons to institutions for the insane.

To us it seems that the decision of the United States Fidelity and Guaranty Company and of any law rests on the interpretation of words rather than facts, for the doctor in this case was appointed by the court to use his knowledge and experience as a physician in making a diagnosis and he made his report purely as a physician. If his report was unsound or the result of prejudice or enmity it seems reasonable to interpret that as *malpractice*, for Webster defines malpractice as "wrongful or negligent practice or action especially in professional or fiduciary conduct". The doctor was acting in both respects because he was giving a professional opinion and, on appointment by the court, had definite fiduciary responsibilities. We concede that no layman is competent to quarrel with an opinion of the Massachusetts Supreme Court, but this situation raises the question of the quality of service under insurance policies supposedly protecting physicians in the exercise of their functions, and the doctor should ascertain exactly how far the service is protective.

MEDICAL DIRECTORIES

THE Arkansas Medical Society in April of this year adopted a resolution condemning the listing of physicians in insurance medical directories. It was maintained that participation by listing in such commercial publications technically constituted indirect solicitations of patients; and the resolution branded the practice as unethical and forbade the listing of its members. The resolution was presented to the House of Delegates of the American Medical Association, was approved by the Judicial Council and adopted by the House of Delegates on May fourteenth.

In certain legitimate medical activities an accurate and comprehensive medical directory is almost invaluable. To be sure, lists are published by the majority of the state societies, but these rarely, if ever, contain little beyond the office and home address of the physician. The *American Medical Directory*, published by the American Medical Association, gives somewhat more detailed information, but the volume, listing as it does all registered physicians in these United States and Canada, covers much more ground than is necessary for the large majority of prospective users. Furthermore, it is expensive, though not unreasonably so.

Some years ago the *Boston Medical Blue Book* was to be found on the desks of many practitioners in and about Boston. Although a commercial publication the participants in the listing were never accused of being unethical, and to many it has seemed unfortunate that the pub-

lishers of this distinctly useful volume have been forced to give it up.

Although the information available in the *Boston Medical Blue Book* was much more complete than that included in the *American Medical Directory,* there seems to be a distinct and urgent need for a small volume containing data, such as that furnished by the latter, on the practicing physicians of the larger cities or of the individual states. Would it not be advantageous to both physicians and the American Medical Association for the latter to reprint city and state sections from the *American Medical Directory?*

A GOOD APPOINTMENT

THE *Journal* is gratified to note that His Excellency, Governor Curley, has submitted for reappointment the name of Samuel Kalesky of Boston as Associate Commissioner of the Department of Mental Diseases. Mr. Kalesky has served for four years in this important, although unpaid, position and has rendered a genuine service to the Commonwealth and to the mentally ill in this capacity.

The medical profession of the Commonwealth will, we hope correctly, interpret this reappointment by His Excellency as indicating a desire not to interfere with the policies of the Department of Mental Diseases, and will take hope from this reappointment that His Excellency may in the near future give further evidence of his interest in the welfare of the mentally ill by the reappointment of the present Commissioner of the Department, Dr. Winfred Overholser.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

HARRISON, TINSLEY R. M.D. For information see This Week's Issue, page 507, issue of September 10. His subject is The Principles of Therapy in Patients with Congestive Heart Failure. Page 517. Address: 403 Wilson Blvd. South, Nashville, Tenn.

SIMMONS, CHANNING C. M.D. Harvard University Medical School 1899. F.A.C.S. Visiting Surgeon, Massachusetts General Hospital. Surgeon-in-Chief, Collis P. Huntington Memorial Hospital. Address: 205 Beacon Street, Boston, Mass. Associated with him are

TAYLOR, GRANTLEY W. A.B., M.D. Harvard University Medical School 1922. F.A.C.S. Assistant in Surgery, Harvard University Medical School. Assistant Surgeon, Massachusetts General Hospital. Surgeon to Out-Patients, Palmer Memorial Hospital. Surgeon, Collis P. Huntington Hospital. Visiting Surgeon, House of the Good Samaritan. Visiting Surgeon, Pondville Hospital at Norfolk, Wrentham. Consulting Surgeon, Massachusetts Eye and Ear Infirmary. Address: 264 Beacon Street, Boston, Mass. And

ADAMS, HERBERT D. A.B., M.D. Harvard University Medical School 1929. Assistant Surgeon, Massachusetts General Hospital and Palmer Memorial Hospital. Assistant Surgical Adviser, Harvard College. Address: 66 Commonwealth Avenue, Boston, Mass. Their subject is Cancer of the Breast. End-Results, Massachusetts General Hospital, 1927, 1928 and 1929. Page 521.

WOODWARD, SAMUEL B. A.B., M.D. Harvard University Medical School 1877. President, Massachusetts Medical Society, 1916-1919. His subject is An Address to the Staff of the Worcester City Hospital. Page 526. Address: 58 Pearl Street, Worcester, Mass.

SPRING, JOHN D. A.B., M.D., C.M. McGill University Faculty of Medicine 1930. On Staff of Memorial and St. Joseph's Hospitals, Nashua, N. H. His subject is Artificial Pneumothorax in the Treatment of Tuberculosis. Page 530. Address: 135 Main Street, Nashua, N. H.

STONE, SIMON. M.D. Tufts College Medical School 1930. D.N.B., 1934. Chief of Admission and Medical Units, New Hampshire State Hospital, Concord, N. H. Attending Psychiatrist, Manchester Mental Hygiene Clinic, Manchester, N. H. His subject is Sexual Sterilization in New Hampshire. Page 536. Address: New Hampshire State Hospital, Concord, N. H.

SCHALL, LEROY A. M.D. Jefferson Medical College 1917. Surgeon, Massachusetts Eye and Ear Infirmary. Assistant Laryngologist at Robert B. Brigham, Palmer Memorial and Collis P. Huntington Memorial Hospitals. Consultant, United States Marine Hospital, No. 2. Consultant, Tumor Clinic, Boston Dispensary. Instructor in Laryngology, Harvard University Medical School. Address: 270 Commonwealth Avenue, Boston, Mass. Associated with him are

RICHARDSON, JOHN R. A.B., M.D. Harvard University Medical School 1931. Clinical Assistant, Massachusetts Eye and Ear Infirmary. Assistant Laryngologist, Newton Hospital. Teaching Assistant in Laryngology, Harvard University Medical School. Address: 395 Commonwealth Avenue, Boston, Mass. And

MUELLER, WERNER. S.B., M.D. Boston University School of Medicine 1930. Clinical Assistant, Massachusetts Eye and Ear Infirmary. Assistant in Laryngology, Courses for Graduates, Harvard University Medical School. Address: 395 Commonwealth Avenue, Boston, Mass. Their subject is Progress in Laryngology. Page 546.

MISCELLANY

TWELFTH ANNUAL CLINICAL CONGRESS OF THE CONNECTICUT STATE MEDICAL SOCIETY

A twenty-five per cent increase in early registrations indicates increased interest on the part of physicians in Connecticut and neighboring states in the Annual Clinical Congress of The Connecticut State Medical Society, which will be held in New Haven on Tuesday, Wednesday and Thursday, September 22, 23, and 24. It is anticipated that last year's attendance of over six hundred will be surpassed. The registration fee for the entire Congress is $2.00. Morning sessions, which will be held in the Auditorium of the Sterling Law Buildings, will begin at 9:30 a. m., daylight saving time. Afternoon sessions will be held in the buildings of the New Haven Hospital and the Yale School of Medicine. They will begin at 2:15 p. m., daylight saving time. Evening sessions, which will also be held at the New Haven Hospital and the School of Medicine, will begin at 8:15 p. m., daylight saving time. The evening meetings have been arranged by the various special sections of the society, but are open to all members of the Congress.

On Tuesday morning with Dr. Stanhope Bayne-Jones, Dean of the Yale School of Medicine, presiding, Dr. Frederic W. Bancroft of New York will speak on "Our Duty to the Fracture Patient," Dr. Burrill B. Crohn will speak on "The Etiology, Treatment and End-Results of Gastro-Duodenal Ulcer," Dr. Foster Kennedy of New York will speak on "What the General Practitioner Should Know about Neurology" and Dr. Thomas M. Rivers of New York on "Poliomyelitis." In the afternoon these same speakers will hold bedside clinics. Dr. Bancroft will present The Surgical Aspect of a Case of Essential Hypertension, Dr. Crohn will present a Case of Colitis and Dr. Kennedy a Case of Encephalitis. Following these, there will be Panel Discussions, at which questions pertinent to the papers read in the morning will be discussed by a panel of physicians from various parts of the state. Dr. Carl W. Henze of New Haven will preside at the symposium on the Treatment of Fractures, Dr. Robert F. Scholl of New Haven at the symposium on Peptic Ulcer, Dr. Otto G. Wiedman of Hartford at the symposium on Neurology and Dr. Alfred Labensky of New London at the symposium on Poliomyelitis. In the evening the Section on Eye, Ear, Nose and Throat with Dr. Walter L. Hogan of Hartford presiding will hear Dr. Perry G. Goldsmith of Toronto speak on "Acute and Chronic Upper Respiratory Inflammation," the Section on Neurology and Psychiatry with Dr. Daniel P. Griffin of Bridgeport presiding will hear Dr. Abraham Myerson of Boston speak on "The Neuroses," the Hezekiah Beardsley Pediatric Club with Dr. Howard W. Brayton of Hartford presiding will hear Dr. Louis K. Diamond of Boston speak on "The Rôle of Iron in the Nutrition of the Young" and the Section on Cardiology with Dr. Louis H. Nahum of New Haven presiding will hear Dr. Howard B. Sprague speak on "The Progress of Cardiology During 1935-1936."

On Wednesday morning Dr. Daniel C. Patterson of Bridgeport, the President of the State Medical Society, will preside. Dr. Louis G. Herrmann of Cincinnati will speak on "Recent Advances in the Diagnosis and Treatment of Peripheral Vascular Diseases," Dr. Vilray P. Blair of St. Louis will speak on "Injuries of the Bones and Soft Tissues of the Face," Dr. Warren T. Vaughan of Richmond on "Recent Advances in the Study of Food Allergy" and Dr. Walter T. Dannreuther of New York on "The Clinical Manifestations of Ectopic Gestation." In the afternoon Dr. Herrmann will present a Case of Raynaud's Disease, Dr. Blair a Case of Cancer of the Mouth, Dr. Vaughan a Case of Migraine and Dr. Dannreuther a Case of Fibroid Tumors of the Uterus. The symposium on Peripheral Vascular Disease will be presided over by Dr. Ashley W. Oughterson of New Haven, the symposium on Injuries to the Bones and Soft Tissues of the Face by Dr. William F. Verdi of New Haven, the symposium on Food Allergy by Dr. Howard S. Colwell of New Haven and the symposium on Gynecology by Dr. Luther Musselman of New Haven. In the evening the Section on Radiology with Dr. Harold R. Lockhart of Bridgeport presiding will hear Dr. Richard Dresser of Boston speak on "The Radiological Management of Cancer of the Breast;" the Section on Dermatology and Syphilology with Dr. Maurice J. Strauss of New Haven presiding will hear Dr. M. B. Sulzberger of New York speak on "Recent Developments in the Diagnosis and Treatment of Diseases of the Skin" and the Section on Obstetrics and Gynecology with Dr. Hartwell G. Thompson of Hartford presiding will see a motion picture depicting Operative Obstetrical Procedures presented by Dr. Emerson L. Stone of New Haven.

On Thursday morning with Dr. Daniel Sullivan of New London presiding, Dr. Leonard Greenburg of New York will speak on "The Practicing Physician and the Diagnosis and Treatment of Occupational Diseases" and Dr. Edwin H. Place of Boston will speak on "Salient Experiences in Thirty Years of Contagious Disease Practice." This will be followed by a Panel Discussion on "Endocrinology of Today." Dr. Roy G. Hoskins of Boston will be the chairman of this panel and the other members will be Dr. Fuller Albright of Boston, Dr. Edgar Allen of New Haven, Dr. Earl Engle of New York, Dr. Max A. Goldzieher of New York, Dr. Raphael Kurzrok of New York and Dr. Elmer L. Sevringhaus of Madison, Wisconsin. In the afternoon Dr. Edgar Mayer of New York will present a Case of Silicosis, Dr. Albright a Case of Parathyroid Disease, Dr. Goldzieher a Case of Pituitary Obesity, Dr. Kurzrok a Case of Primary Amenorrhea and Dr. Sevringhaus a Case of Diabetes. Dr. Arthur B. Dayton of New Haven will preside at the symposium on Industrial Diseases and Dr. Joseph I. Linde at the symposium on Immunity Procedures in Acute Infections.

On Tuesday and Wednesday afternoons members of the Congress will meet for a social hour at the New Haven Medical Association.

The Women's Medical Society of Connecticut will meet for luncheon at 12:45 p. m., on Wednesday, September 23, at the Dutch Treat Tea Room. Dr. Leda Stacy of White Plains will be the guest speaker. All medical women are welcome.

OBITUARY

THE DEATH OF LORD MOYNIHAN

On September 7, 1936, Baron Berkeley George Andrew Moynihan died six days after his wife whom he married in 1895. He collapsed the day after her funeral and did not respond to efforts to sustain him.

Lord Moynihan was born in Malta, the son of a captain in the King's Regiment. He held honorary degrees from Oxford, Durham, Leeds, Edinburgh, Bristol, St. Andrews, McGill, Toronto, Winnipeg, Ghent, Buenos Aires, Dublin, Cairo and Belfast, and during the World War was brevetted Colonel. He was Emeritus Professor of Surgery at the University of Leeds. From 1926 to 1932 he was President of the Royal College of Surgeons and was Senior Consulting Surgeon of the Royal Army Corps of the British Army.

In 1917 he came to the United States to assist this country in creating and training the Medical Corps.

Lord Moynihan was especially prominent in the treatment of cancer and diseases of the abdominal organs. Many American surgeons made pilgrimages abroad to visit Lord Moynihan's Clinics, for he was recognized as one of the leading surgeons of recent years.

NOTICES

THE EDWARD K. DUNHAM LECTURESHIP

In 1923 there was founded in memory of Dr. Edward K. Dunham (M.D., Harvard, 1886), the Edward K. Dunham Lectureship for the Promotion of the Medical Sciences. Among the useful purposes for which the Foundation was established was that of binding closer "the bonds of fellowship and understanding between students and investigators in this and foreign countries." The lecturers are chosen from "eminent investigators and teachers in one of the branches of the Medical Sciences, or of the basic Sciences which contribute towards the advance of Medical Science in the broadest sense." The lectures, which are given annually, are "free and open to the faculty and students of the Harvard Medical School and College, and all other interested professional persons who may profit by them."

The Faculty of Medicine of Harvard University has announced that two lectures will be given under the Edward K. Dunham Lectureship for the Promotion of the Medical Sciences on "The Significance of Catalysis in Biology."

Tuesday, October 6, "The Catalytic Equipment of Micro-organisms."

Thursday, October 8, "The Nature of Biocatalytic Systems in General."

At five o'clock at the Harvard Medical School Amphitheater, Building C.

By Sir Frederick Gowland Hopkins, M.D., D.Sc., LL.D., Professor of Biochemistry, University of Cambridge.

TWENTY-FIRST INTERNATIONAL ASSEMBLY OF THE INTER-STATE POST-GRADUATE MEDICAL ASSOCIATION

The twenty-first International Assembly of the Inter-State Post-Graduate Medical Association of North America, under the presidency of Dr. David Riesman of Philadelphia, Pennsylvania, will be held in the public auditorium of St. Paul, Minnesota, October 12, 13, 14, 15 and 16 with pre-assembly clinics on Saturday, October 10 and post-assembly clinics Saturday, October 17, in the hospitals of St. Paul. (Detailed program appears on page 566.)

The aim of the program committee, with Dr. George Crile as chairman, is to provide for the medical profession of North America an intensive post-graduate course covering the various branches of medical science. The program has been carefully arranged to meet the demands of the general practitioner, as well as the specialist. Extreme care has been given in the selection of the contributors and the subjects of their contributions.

In co-operation with the Minnesota State Medical Association, the Ramsey County Medical Society will be host to the Assembly and has arranged an excellent list of committees that will function throughout the Assembly.

A most hearty invitation is extended to all members of the profession who are in good standing in their State or Provincial Societies to be present and enjoy the hospitality of the medical profession of St. Paul. A registration fee of $5.00 will admit each member of the medical profession in good standing to all the scientific and clinical sessions.

It is of interest to note that the work of this Association has been endorsed by Dr. Charles H. Mayo, Dr. Henry A. Christian, Dr. Arthur D. Bevan, Dr. Lewellys F. Barker, Dr. William D. Haggard, Dr. George Crile, Dr. Edward Archibald, Dr. Archibald Young and Mariano R. Castex.

A list of the distinguished teachers and clinicians who will take part in the program may be found on page 566.

Special railroad rates will be in effect.

For further information write Dr. W. B. Peck, Managing-Director, Freeport, Illinois.

NOTICE OF MEETING

INTERNATIONAL MEDICAL ASSEMBLY

INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

OCTOBER 12, 13, 14, 15, 16, 1936

Pre-Assembly Clinics, October 10
Post-Assembly Clinics, October 17
St. Paul Hospitals
ST. PAUL, MINNESOTA

MONDAY, OCTOBER 12

8:00 a. m.

Diagnostic Clinic: "Coronary Thrombosis and Angina Pectoris."
Dr. Fred M. Smith, Professor of Theory and Practice of Medicine, State University of Iowa College of Medicine, Iowa City, Iowa.

Diagnostic Clinic: "Diseases of the Thyroid Gland."
Dr. Robert S. Dinsmore, Cleveland Clinic, Cleveland, Ohio.

Diagnostic Clinic: "Rheumatoid Arthritis."
Dr. Russell L. Haden, Chief of Medical Division, Cleveland Clinic, Cleveland, Ohio.

Intermission for Review of Exhibits

Diagnostic Clinic: "Trigeminal Neuralgia."
Dr. Francis C. Grant, Assistant Professor of Neurological Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Diagnostic Clinic: "Surgical Treatment of Diseases of the Biliary Tract."
Dr. Waltman Walters, Associate Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Noon Intermission

1:00 p. m.

Address: "Obstetric Hemorrhages and Their Treatment."
Dr. Jennings C. Litzenberg, Professor of Obstetrics and Gynecology, University of Minnesota Medical School, Minneapolis, Minn.

Address: "Relation of the Endocrine Glands to Sterility."
Dr. Emil Novak, Associate Professor of Obstetrics, University of Maryland School of Medicine, Baltimore, Md.

Address: "Diffuse Adenomatosis of the Colon."
Dr. Fred W. Rankin, Lexington, Kentucky.

Intermission for Review of Exhibits

Address: "Treatment of Diabetes during Surgical Emergencies."
Dr. Herman O. Mosenthal, Professor of Clinical Medicine, New York Postgraduate Medical School, New York, N. Y.

Address: "Problems in the Diagnosis of Diabetes."
Dr. Robert D. Lawrence, M.A., M.D., F.R.C.P., Physician to Kings College Hospital, Diabetic Department, London, England.

Address: "Neurological Surgery."
Dr. Loyal Davis, Professor of Surgery, Northwestern University School of Medicine, Chicago, Illinois.

Dinner Intermission

7:00 p. m.

Address: "Endocrine Disorders in Childhood."
Dr. Frederick W. Schlutz, Richard T. Crane Professor of Pediatrics, University of Chicago School of Medicine, Chicago, Ill.

Address: "Peritonitis."
Dr. Frederick A. Coller, Professor of Surgery, University of Michigan Medical School, Ann Arbor, Michigan.

Address: "Very Recent Advances in Medicine."
Dr. Russell M. Wilder, Professor of Medicine, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Address: "Practical Points in Clinical Surgery."
Dr. W. Wayne Babcock, Professor of Surgery and Clinical Surgery, Temple University School of Medicine, Philadelphia, Pa.

Address: "Intravenous Anesthesia by Means of a New Thiobarbiturate, Pentothal Sodium."
Dr. John S. Lundy, Professor of Anesthesia and Surgery, University of Minnesota Graduate School of Medicine, Mayo Clinic, Rochester, Minn.

TUESDAY, OCTOBER 13

8:00 a. m.

Diagnostic Clinic: "Clinical Nutritional Disease (Vitamin B Deficiency)."
Dr. Andrew Almon Fletcher, University of Toronto Faculty of Medicine, Toronto, Canada.

Diagnostic Clinic: "Diagnosis and Treatment of Brain Tumors."
Dr. Walter E. Dandy, Adjunct Professor of Neurological Surgery, Johns Hopkins University School of Medicine, Baltimore, Md.

Diagnostic Clinic: "Relation between Neurology and Psychiatry."
Dr. Bernard Sachs, Professor of Clinical Neurology, Columbia University College of Physicians and Surgeons, New York, N. Y.

Intermission for Review of Exhibits

Diagnostic Clinic: "Tumors of the Breast."
Dr. John F. Erdmann, Attending Surgeon of the New York Postgraduate Hospital and Medical School, New York, N. Y.

Diagnostic Clinic: "The Psychobiology of the Peptic Ulcer Patient."
Dr. George Draper, Associate Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York, N. Y.

Noon Intermission

1:00 p. m.

Diagnostic Clinic: "Treatment and Guidance of Patients with Damaged Hearts."
Dr. David Riesman, Professor of Clinical Medicine and Professor of History of Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Address: "The Treatment of Endocervicitis."
Dr. Walter T. Dannreuther, Professor of Clinical Gynecology, New York Postgraduate Medical School, New York, N. Y.

Address: "Tumors of the Bladder."
Dr. Hugh H. Young, Professor of Urology, Johns Hopkins University School of Medicine, Baltimore, Md.

Intermission for Review of Exhibits

Address: (Subject to be supplied).
Dr. Francis J. Charteris, M.D., Ch.B., Professor of Materia Medica and Therapeutics, St. Andrews University School of Medicine, St. Andrews, Scotland.

Address: "Factors Frequently Overlooked in the Management of the Patient with Heart Disease."
Dr. Charles A. Elliott, Professor of Medicine, Northwestern University School of Medicine, Chicago, Ill.

Address: "The Diagnosis of Intra-Cranial Complications of Oral and Nasal Sinus Suppuration."
Dr. Wells P. Eagleton, OALR, Newark, New Jersey.

Address: "Treatment of Acute and Chronic Mastoiditis."
Dr. Matthew S. Ersner, Professor of Otolaryngology, Temple University School of Medicine, Philadelphia, Pa.

Dinner Intermission

7:00 p. m.

Address: "The Consideration and Management of Some of the More Common Congenital Deformities of the Rectum."
Dr. Vernon C. David, Clinical Professor of Surgery, Rush Medical College, Chicago, Ill.

Address: "The Diagnosis and Treatment of Tumors of the Bladder by Means of the Roentgen Rays."
Dr. George E. Pfahler, Professor of Radiology, University of Pennsylvania Graduate School of Medicine, Philadelphia, Pa.

Address: "The Cerebral Regulation of Autonomic Function."
Dr. John F. Fulton, Sterling Professor of Physiology, Yale University School of Medicine, New Haven, Conn.

Address: "Syphilis of the Heart and Blood Vessels."
Dr. Maurice C. Pincoffs, Professor of Medicine, University of Maryland School of Medicine, Baltimore, Md.

Address: "The Management of Intestinal Obstruction."
Dr. Owen H. Wangensteen, Professor of Surgery, University of Minnesota Medical School, Minneapolis, Minn.

WEDNESDAY, OCTOBER 14

8:00 a. m.

Diagnostic Clinic: "Paralyses in Children."
Dr. Bronson Crothers, Assistant Professor of Pediatrics, Harvard University Medical School, Boston, Mass.

Diagnostic Clinic: "Carcinoma of the Stomach."
Dr. Donald C. Balfour, Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Diagnostic Clinic: "Economic Advantages of Early Protected Weight-Bearing in Fractures of the Leg, Foot and Ankle."
Dr. Fraser B. Gurd, McGill University Faculty of Medicine, Montreal, Canada.

Intermission for Review of Exhibits

Diagnostic Clinic: "Essential Hypertension."
Dr. Alfred W. Adson, Professor of Neurosurgery, University of Minnesota Graduate School of Medicine,

and

Dr. E. V. Allen, Assistant Professor of Medicine, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Diagnostic Clinic: "Bodily Type in Relation to Endocrine Function."
Dr. Charles R. Stockard, Professor of Anatomy, Cornell University Medical College, New York, N. Y.

Noon Intermission

1 p. m.

Diagnostic Clinic: "The Nature and Management of Nephritic Edema."
Dr. Louis H. Newburgh, Professor of Clinical Investigation in Internal Medicine, University of Michigan Medical School, Ann Arbor, Mich.

Address: "Circulatory Failure in Acute Infectious Diseases."
Dr. William R. Williams, Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: "Genesis and Surgical Treatment of Essential Hypertension."
Dr. George Crile, Cleveland Clinic, Cleveland, Ohio.

Intermission for Review of Exhibits

Address: "Relation of Diseases of the Sinuses to Organic Disease."
Dr. Robert F. Ridpath, Professor of Laryngology and Rhinology, Temple University School of Medicine, Philadelphia, Pa.

Address: "Intrathoracic Goiter."
Dr. Charles G. Heyd, Professor of Clinical Surgery, New York Postgraduate Medical School, New York, N. Y.

Address: "Non-Surgical Diseases of the Colon."
Dr. Joseph W. Larimore, Associate Professor of Clinical Medicine, Washington University School of Medicine, St. Louis, Mo.

Address: "The Sella Turcica."
Dr. Eric Oldberg, Professor of Neurology and Neurological Surgery, University of Illinois College of Medicine, Chicago, Ill.

ASSEMBLY DINNER

For members of the profession,
their ladies and friends
Informal
7:00 p. m.
Dr. Charles H. Mayo, Master of Ceremonies

Addresses by:

Rear-Admiral P. S. Rossiter,
Surgeon General, United States Navy,
Washington, D. C.

Major General Charles R. Reynolds,
Surgeon General, United States Army,
Washington, D. C.

Other distinguished citizens of the world.

THURSDAY, OCTOBER 15

8:00 a. m.

Diagnostic Clinic: "The Relation of the Psychoses to Systemic Diseases."

Dr. Earl D. Bond, Professor of Psychiatry, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Diagnostic Clinic: "Indications for Surgery and the Surgical Treatment of Peptic Ulcer."

Dr. Frank H. Lahey, Director of Surgery in the Lahey Clinic; Surgeon of the New England Baptist Hospital and New England Deaconess Hospital, Boston, Mass.

Diagnostic Clinic: (Subject to be supplied).

Dr. Leonard G. Rowntree, Philadelphia Institute for Medical Research, Philadelphia, Pa.

Intermission for Review of Exhibits

Diagnostic Clinic: "Cryptorchidism."

Dr. Hugh Cabot, Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn.

Diagnostic Clinic: "The Relation of Lumbosacral Joint to Low Back Pain."

Dr. Alan DeForest Smith, Clinical Professor of Orthopedic Surgery, Columbia University College of Physicians and Surgeons, New York, N. Y.

Noon Intermission

1:00 p. m.

Address: "Allergic Diseases."

Dr. Robert A. Cooke, Assistant Professor of Clinical Medicine, Cornell University Medical College, New York, N. Y.

Address: "Significance of Menorrhagia and Metrorrhagia."

Dr. John R. Fraser, Professor of Obstetrics and Gynecology, McGill University Faculty of Medicine, Montreal, Canada.

Address: "Application of Cavity Grafting."

Mr. Archibald H. McIndoe, M.B., Ch.B. (N. Z.); M.Sc. (Path.); M.S.; F.A.C.S., F.R.C.S. (England), Assistant Plastic Surgeon, St. Andrew's Hospital; Assistant Surgeon, Plastic Unit, St. James's Hospital; Consulting Plastic Surgeon, Royal North Staffordshire Infirmary; Chief Assistant Plastic Surgery, St. Bartholomew's Hospital; Senior Surgeon, Hospital for Tropical Diseases, London, England.

Intermission for Review of Exhibits

Address: "Function and Deformity in Fracture Results."

Dr. Eldridge L. Eliason, Professor of Clinical Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pa.

Address: "The Early Diagnosis of Bronchiogenic Carcinoma."

Dr. Chevalier Jackson, Professor of Bronchoscopy and Esophagoscopy. Temple University School of Medicine,

and

Dr. Chevalier L. Jackson, Professor of Clinical Bronchoscopy and Esophagoscopy, Temple University School of Medicine, Philadelphia, Pa.

Address: "Water Balance in Children."

Dr. Samuel Z. Levine, Acting Professor of Pediatrics, Cornell University Medical College, New York, N. Y.

Address: "The Surgery of Acute and Chronic Compression of the Heart."

Dr. Claude S. Beck, Associate Professor of Surgery, Western Reserve University School of Medicine, Cleveland, Ohio.

Dinner Intermission

7 p. m.

Address: "Ophthalmic Consultations in a General Hospital."

Dr. Lawrence T. Post, Professor of Ophthalmology, Washington University School of Medicine, St. Louis, Mo.

Address: "General Therapeutic Methods for the Protection of Patients in the Extremes of Life."

Dr. Irving S. Cutter, Dean and Associate Professor of Medicine, Northwestern University Medical School, Chicago, Ill.

Address: "Periodic Health Examinations."

Dr. Reginald Fitz, Associate Professor of Medicine, Harvard University Medical School, Boston, Mass.

Address: "The Surgical Anatomy of the Anal Canal."

Mr. C. Naunton Morgan, F.R.C.S., Senior Assistant Surgeon to St. Mark's Hospital for Diseases of the Rectum; Surgeon to the Hospital for Tropical Diseases; Casualty Surgeon to St. Bartholomew's Hospital, London, England.

Address: "The Diagnostic Significance of the Respiratory Rate."

Dr. Frederick J. Kalteyer, Clinical Professor of Medicine, Jefferson Medical College, Philadelphia, Pa.

FRIDAY, OCTOBER 16

8:00 a. m.

Diagnostic Clinic: "The Differential Diagnosis of Pain in the Chest."

Dr. John A. Oille, Assistant Professor of Medicine, University of Toronto Faculty of Medicine, Toronto, Canada.

Diagnostic Clinic: "Fracture of the Neck of the Femur: The Problem Fracture."

Dr. John J. Moorhead, Professor of Clinical Surgery, New York Postgraduate Medical School, New York, N. Y.

Diagnostic Clinic: "Protamine Insulin."

Dr. Elliott P. Joslin, Clinical Professor of Medicine, Harvard University Medical School,

and

Dr. Priscilla White, Boston, Mass.